SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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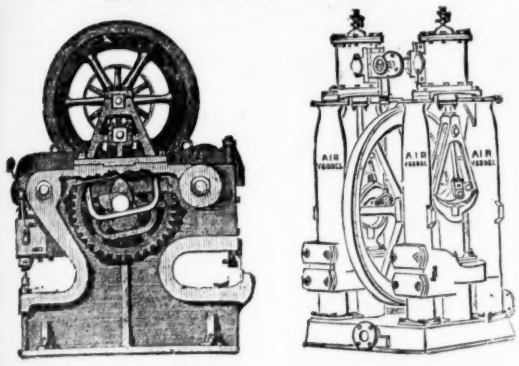

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PARIS, BRONZE MEDAL, 1867. ORDER OF THE CROWN OF PRUSSIA. FALMOUTH, SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE McKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24·90, 27·60, 24·80, 26·10, 28·30, 27·10, 28·40, 28·70 metres. Total advance of south heading during January was 121·30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere (7½ lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL: and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

These Machines possess many advantages, which give them a value unapproached by any other system of Boring Machine.

THE McKEAN ROCK DRILL IS ATTAINING GENERAL USE THROUGHOUT THE WORLD FOR MINING, TUNNELLING, QUARRYING, AND SUB-MARINE BORING.

The McKEAN ROCK DRILLS are the most powerful—the most portable—the most durable—the most compact—of the best mechanical device. They contain the fewest parts—have no weak parts—act without SHOCK upon any of the operating parts—work with a lower pressure than any other Rock Drill—may be worked at a higher pressure than any other—may be run with safety to FIFTEEN HUNDRED STROKES PER MINUTE—do not require a mechanic to work them—are the smallest, shortest, and lightest of all machines—will give the longest feed without change of tool—work with long or short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or open work. Their working parts are best protected against grit and accidents. The various methods of mounting them are the most efficient.

N.B.—Correspondents should state particulars as to character of work in hand in writing us for information, on receipt of which a special definite answer, with reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL, IRON, AND FLEXIBLE TUBING.

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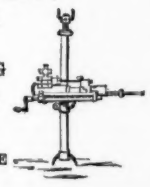

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(LIMITED).

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IMPORTANT NOTICE TO MINE PROPRIETORS.

MR. GEORGE GREEN, ENGINEER, ABERYSTWITH SUPPLIES MACHINES under the above Company's Patents o DRESSING all METALLIC ORES. Dressing-floors having these Machines possess the following advantages:—

1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.

2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED BY DRESSING-FLOORS IS REQUIRED.

3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.

4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines Darlington, Colberry, Nanthead, and Bollyhope; the Stonecroft and Greyside Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Darren, Esgairmwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines, Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Bratsberg Copper Mines, Norway, and Mines in Italy, Germany, United States of America, and Australia, from all of whom certificates of the complete efficiency of the system can be had.

WASTE HEAPS, consisting of refuse chats and skimpings of a former washing, containing a mixture of lead, blende, and sulphur DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly profit on our Nanthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, if it had been wholly engaged in dressing wastes our returns would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines, says—"Your machinery saves fully one-half on old wages, and vastly more on the wages we have now to pay. Over and above the saving in cost is the saving in ore, which is not much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The separation which they make is complete."

Mr. MONTAGUE BEALE says—"It will separate ore, however close the mechanical mixture, in such a way as no other machines can do."

Mr. C. DODSWORTH says—"It is the very best for the purpose and will do for any kind of metallic ores—the very thing so long needed for dressing-floors."

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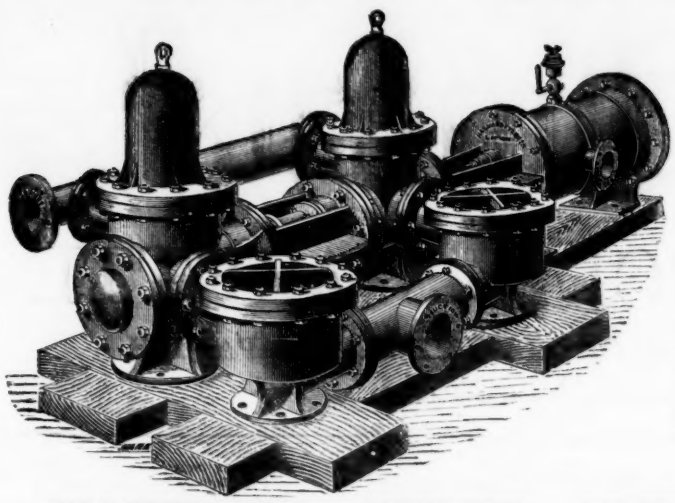

PRIZE MEDALS.

Royal Cornwall Polytechnic	1872.
Vienna Exhibition	1873.
Lille Comice Agricole	1874.
Lille " "	1875.
Manchester Pomona	1874.
Cologne Horticultural	1875.
Leeds, Yorkshire	1875.

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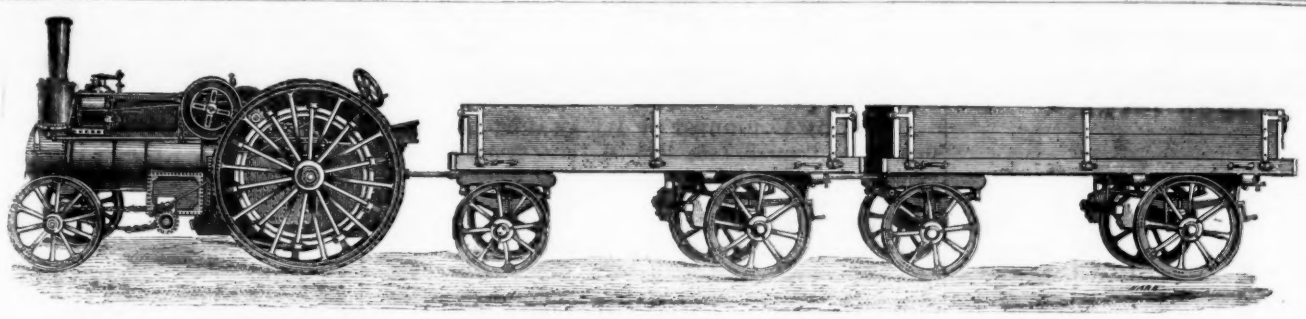

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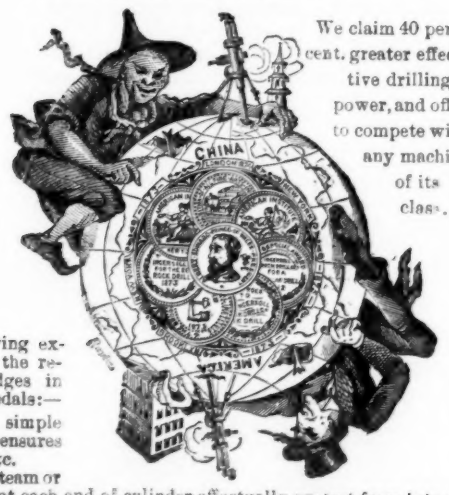

We claim 40 per cent. greater effective drilling power, and offer to compete with any machine of its class.

The following extracts from the reports of Judges in awarding Medals:—

"2. Its simple construction ensures durability, &c.

"4.—The steam or air cushions at each end of cylinder effectually protect from injury

"5. Its having an automatic feed, giving it a steady motion, &c.

"6. Its greater steadiness and absence of jar and vibration experienced in other drills, which is very destructive to their working parts, &c.

"7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

Medals awarded for several years in succession "For the reason that we adjudge it so important in its use and complete in its construction as to supplant every article previously used for accomplishing the same purpose."

Estimates given for Air Compressors and all kinds of Mining Machinery. Send for Illustrated Catalogues, Price Lists, Testimonials, &c., as above.

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(ESTABLISHED 1770.)

MANUFACTURERS OF EVERY DESCRIPTION OF IMPROVED

PATENT FLAT AND ROUND WIRE ROPE

from the very best quality of charcoal iron and steel wire.

PATENT FLAT AND ROUND HEMP ROPES,

SHIPS' RIGGING, SIGNAL AND FENCING STRAND, LIGHTNING CONDUCTORS, STEAM PLOUGH ROPES (made from Webster and Horsfall's patent steel wire), HEMP, FLAX, ENGINE YARN, COTTON WASTE, TARPAULING, OIL SHEETS, BRATTICE CLOTHS, &c.

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STANDS UNRIVALLED

For Tunnels, Mines, Quarries, Harbour Works, Cutting Blocks of Granite, &c.

The working parts are made of the toughest steel and phosphor-bronze—steel castings are also used—so as to combine strength with light weight.

AIR-COMPRESSING MACHINERY

Of the simplest and best construction.

Combined Water-pressure Engines and Air-compressors,

Giving most excellent results.

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Air Tubing and Improved Brattice Cloth,

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Tarred, Oiled, and Non-Inflammable.

THE OILED CLOTH IS ESPECIALLY RECOMMENDED FOR DAMP MINES, AND IS ALSO A GOOD COVERING FOR SHEDS.

THE NON-INFLAMMABLE FOR THE MORE DANGEROUS MINES.

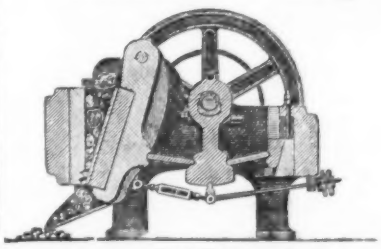
Samples and prices free, on application at the Works,

VARLEY STREET, OLDHAM ROAD, MANCHESTER.

BROADBENT'S

Patent Improved Blake Stone Breakers.

GUARANTEED NO INFRINGEMENT OF ANY PATENT.



AWARDED PRIZE MEDAL,

In competition with the best-known Stone Breakers, September 7th, 1876,

Formerly Manufacturers for the late H. R. Marsden, having made for him in less than four years 336 Stone Breakers.

ESTABLISHED 1836.

Prices and particulars on application to the Patentees and Sole Makers,—

ROBT. BROADBENT AND SON, STALYBRIDGE.

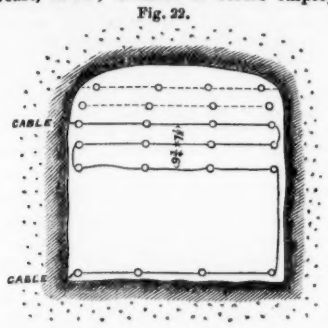
LONDON OFFICE:—10, MOORGATE STREET, E.C.

Original Correspondence.

ROCK-BORING MACHINERY—No. XII.

16.—DRYBROOK IRON MINE.—Sinking shaft and driving level. Rock—Magnesia limestone; level—width 6 ft., height 6 ft. 8 in.; area of forebreast, 40 ft.; number of borers employed, 1; number of holes in forebreast, 34; depth of holes bored on Brain's radial system, 3 ft. 1 in. to 4 ft. 3 in.; diameter of hole, 1¼ in.; number of blows per minute per Darlington borer, 400 to 500.

Fig. 22.

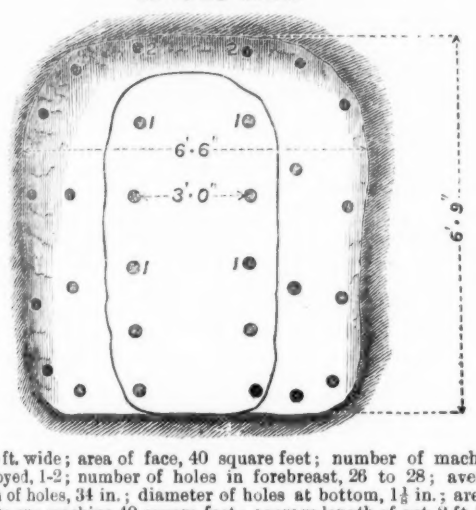


17.—SIR FRANCIS LEVEL (Yorkshire). Lime, marl, and hard grit; stone hard, with lines of cleavage crossing the lines of the holes; length of level, 4400 ft.; forehead—height 7 ft., width 5 ft.; area of face, 35 square feet; number of holes per running fathom, 30; number of blows made by McKean borer 500 to 600 per minute.

18.—FREDERICHSEGEN (Lahn Prussia). Rock—Coblenzer slates and quartzite. Adit level, 6½ ft. by 7 ft.; area, 45½ ft.; number of holes bored in forebeast, 24; diameter of holes, 1¼ in; depth of holes, 4½ ft.; number of borers simultaneously employed, 4; number of strokes per minute by the Dubois and François machine, 300.

19.—MINERA MINES (Wrexham). Rock—Mountain limestone, short, jointy, sometimes cherty, drusy, and vughy. (1.) Plat cut at the 200 yard level by means of a Darlington machine, mounted on a vertical stretcher-bar. (2.) Shaft sunk from 200 to 220 yard level, by means of a boring-machine, mounted on a horizontal arm, rotating on a vertical bar 12 ft. long; diameter of shaft, 8½ ft.; area of bottom, 56¾ ft.; number of holes in bottom of shaft, 36; depth of holes, 2½ to 3 ft.; diameter of holes at bottom, 1¼ in.; number of men employed, 9. (3.) A cross-cut (Fig. 23), 6 ft. 9 in. high by 6½ ft. wide; area of face, 40 square feet; number of machines employed, 1-2; number of holes in forebreast, 26 to 28; average depth of holes, 34 in.; diameter of holes at bottom, 1¼ in.; area of face to one machine 40 square feet; average length of cut, 2 ft. 7 in.

Fig. 23.



Cut,	10 holes each	...	...	3 ft. deep.
First square up,	8 „	...	...	2¾ „
Second „	8 „	...	...	2¼ „
Total	26			
Roof-holes	2 „	...	...	3 „
Total	28			

Cubic contents of lineal yard, 13 tons; number of men employed, 9; length of shift, 8 hours. Cut blasted as follows:—(1.) Cut or centre, 10 holes. (2.) First square up, 8 holes. (3.) Second square up and roof-holes, 10. Dynamite consumed per lineal yard of advance in the cross-cut, 12 to 13 lbs.; number of advances made per week, variable; hindrances frequent, owing to influx of water, inadequacy of drawing-power, breakage of pump-rods and shaft-gear; rate of driving, about *four* times greater than if done solely by hand-labour. Hand price, 9*l.* per yard; machine price, 6*l.* per yard.

20.—JOHANN COLLIERY (Prussia). Rock—Hard standstone, sandstone schist; shaft 14 ft. wide, length 16½ ft.; area of bottom, 228 square feet; average depth of hole bored in schist, 58 in.; number of machines employed, 6; total number of holes bored per metre of ground sank, 20; number of men employed in sinking shaft, including labourers, 20 to 22; length of shift, 8 hours; average number of shifts worked monthly, 427; machine cost per metre sunk, 34s. 2d.; labour cost, including cost of timber, per metre sunk, 14*l.* 6s. 6d.; total cost, 16*l.* 0s. 8d.

21.—MAESTEG TUNNEL (Bridgend). Rock—Pennant; height of level 9 ft., width 10 ft.; area of face, 70 square feet; contents per lineal yard, 270 cubic feet; number of boring machines employed, 2; diameter of borer cylinders, 4 in.; blows made by borer per minute, 300; diameter of holes, 2⅛ in., diminishing to 1¾ in.; depth of holes, about 4 ft.; tool, T; number of holes bored in forebreast per advance, 16 to 20; diameter of air main, 4 in.; time required to bore holes, 4½ hours; time required for boring, blasting, and removal of stuff, 12 hours; number of advances made per 24 hours, 2; length of advance, about 4 ft.

22.—CWMBRAN (Newport). Rock—Coarse grain sandstone; height of level 7 ft., width 10 ft.; area of face, 70 square feet; contents per lineal yard, 210 cubic feet; number of boring machines employed, 2; diameter of boring cylinders, 4 in.; blows made per minute, 400 to 500; pressure of air required, 70 to 80 lbs. per inch; diameter of shot-hole, 2½ in., diminishing to 1¼ in.; depth of holes, 2½ to 3 ft.; tool, thick chisel point; number of holes bored in face per advance, 10 to 12; number of cuts per 24 hours, variable; ground driven per week, 10 to 14 yards; length of level driven, about 1000 yards; dynamite consumed per yard of ground, 20 to 24 lbs.

23.—DOLCOATH. Level, 1884 ft. below the surface; dimensions, 6 ft. by 7 ft.; area, 42 square feet; number of Barrow machines employed, 1; borer cylinder, 3¼ in. diameter; piston-rod, 2 in. diameter; length of machine from top to end of piston-rod, 3 ft. 4 in.; number of strokes per minute, 300; air-pressure required, 55 to 60 lbs. per square inch; number of holes in forebreast, 20 to 24; average depth of holes, 20 in.; number of holes drilled in eight hours, 14; borer points, 1¼, 1⅛, and 1 in. wide; time occupied in boring, charging, and firing the holes, including removal of the debris, 10 to 12 hours; number of hands employed with machine, 3, or 9 per 24 hours.

24.—SOUTH CROFTY (Cornwall). Air compressor—cylinder 12 in. diameter, 18 in. stroke; steam cylinder, 14 in. diameter, and 18 in. stroke; air conveyed underground in pipes 2 in. diameter; air pressure required to run boring machine, 50 to 55 lbs.; one machine employed in the 205 fm. cross-cut; number of men employed 6, boys 3—total, 9 hands; dynamite consumed per lineal yard of ground, 25 lbs.; diameter of shot-holes, 1½ in.; length of hole, 2 ft.

APPROXIMATE MONTHLY COST OF WORK, AS FURNISHED BY A CORNISH AGENT.

3 men, at	£5	0	0	...	£15 0 0
3 men, at	3	10	0	...	10 10 0
3 boys, at	2	0	0	...	6 0 0
Labour cost				...	£31 10 0
Dynamite	£25	0	0		
Coals, 10 cwts. daily	10	0	0		
Grease, oil, fuse, &c.	7	0	0		
Smith cost, &c.	5	0	0	=	£47 0 0
Repairs					5 0 0
At 5 fms. monthly, 16*l.* 10s. per fm.					£83 10 0

[NOTE.—In the foregoing rough estimate no charge appears for enginemen.]

25.—CARN BREA (Cornwall). Level, 8½ ft. by 8½ ft.; area, 72 square feet; depth of level from surface, 1356 ft.; air-pipes mainly 3 in. diameter; diameter of cylinders of boring-machines, 4 in.; number of machines running together, 4; pressure of air required, 40 lbs. per square inch; air compressor to run four machines, two cylinders each, 18 in. diameter, and 30 in. stroke; steam cylinders, 20 in. diameter, and 36 in. stroke; sectional area of forebreast to one machine, 18 square feet; number of holes to a blast, about 18; depth of holes, 3 to 3½ ft.; diameter of holes, 2 in.; time required to put down 18 holes, 4 to 5 hours. The monthly cost of the work is not known, but the following rough estimate is furnished by a practical miner:—

15 men boring and blasting	£	76	0	0	
2 men at engine		7	0	0	
2 smiths and boys		10	0	0	
2 fillers		12	0	0	
Dynamite		85	0	0	
Coal, 2 tons per 24 hours		40	0	0	
Grease, oil, fuse, detonators, &c.		25	0	0	
Repairs		10	0	0	
Agency		22	0	0	
Total	£	287	0	0	

Drivage four weeks, 14 fathoms or, cost $\left(\frac{287}{14}\right)$ 20*l.* 10s. per fathom.

26.—BALLACORKISH (Isle of Man). Rock—Tough, jointy, clay-slate, with veins of quartz. Shaft: depth, about 70 fms. from surface; diameter, 10½ ft.; area, 86 square feet. Number of Darlington machines employed, 2. Area of shaft to one machine, 43 square feet; pressure of air required, 45 to 55 lbs. Number of strokes per minute, about 400; number of men employed, 9; length of shift, 8 hours. Number of holes bored in bottom of shaft, 22 to 24; depth of holes, 3½ to 4½ ft.; diameter of holes, 1¼ to 1 in.; depth of sink, about 4 ft. Proportion of time of boring to time of other operation, 1 to 5. Hand price, 31*l.* per fathom; machine price, 13*l.* per fathom. Speed, 2 fathoms weekly; machine speed, 5 times greater than hand speed.

JOHN DARLINGTON.

ROCK DRILLS.

SIR,—I observe by the report of the proceedings, which appears in your widely read Journal of Saturday last, that the trial of rock drills at South Roskear on the 22nd ult. seems to have resulted unfortunately for the Barrow drill. It is not to be wondered at, after the excessive praise given to the performances of this drill by Messrs. Thomas and Loam, that the latter gentleman is annoyed at the fact that the machine when tried in the presence of the "practicals" would not "go." When, however, Messrs. Loam and Son put the question, "How many drills have proved their worth by continuous and successful working month and month in the hard rocks of our mines?" the answer is simple enough, almost as many as have been properly worked. In one observation, Messrs. Loam and Son are correct; "show trials," whether at a foundry in London or Cornwall, are practically useless; they may may serve to amuse or to develope the shallow conceits of mine directors and secretaries, but they afford no guide whatever for determining the the merits or value of a rock-boring machine.

Penzance, Dec. 5. A SHALLOW SHAFT.

ROCK DRILL TRIAL.

SIR,—The trial—or, as Mr. Loam says in last week's Journal, "the so-called trial"—of the Barrow drill may be unsatisfactory to Mr. Loam, but an impartial person cannot regret that the exhibition was a discomfiture to those who continuously misrepresent facts by asserting that "the Barrow is the only machine in Cornwall successfully worked. I do regret, however, that gentlemen who for the first time saw a drill at work did not see the point of the Barrow drill being ground off on a hard stone by the man at the rear, the gear being worn out by the everlasting turning to and fro. I regret, also, that the parent of this machine, the Kainotomon, was not tried, for there would have been seen the machine not spoilt to secure a patent, but a machine that would bore as well as others exhibited, and as continuous as the Barrow. All kinds of tricks are adopted to evade existing patents—Burleigh's turned upside down, &c., as witnessed at a public trial this week of a recent machine. I believe I have seen, with two exceptions, all the machines offered to miners as rock drills, and can say with Mr. Loam they will bore holes, but where have they failed? I know but one that has been knocked to pieces, and that certainly was not in Cornwall, neither do I believe that any machine yet tried in the county will not endure as much work and wear as the Barrow—may be considerably more.

We have been favoured with no real reliable data as to the actual costs at Dolcoath Mine. I have a statement of the comparative cost of the four drills at Carn Brea, the ground driven and cost per fathom, also, at South Crofty. The statement debits Carn Brea machines with agency 22*l.* per month; engine men, 7*l.*, or an expense of 2*l.* per fathom, which are entirely omitted in the estimate of cost at South Crofty. Notwithstanding this, there are are all the costs of an outside agency, independent of the regular mine staff and the company's profit (Rock-Boring Company), which never ought to be if Cornish managers are up to their work. The stated cost of the former per month was 287*l.*; ground driven, 14 fathoms; cost per fathom, 20*l.* 10s. The cost of the latter (South Crofty) for one month is said to be 83*l.* 10s.; ground driven, 4 fms. 3 ft.; cost per fathom, 18*l.* 11s. 1½d. The former drills are working on a hard tin capel or lode—the latter in granite. Of the number of tons broken from driving a wide level for four drills I am without data, but I presume the level might be carried 8 ft. wide; if so, the tons broken at Carn Brea are greatly in excess of what is done at South Crofty. The repairs of seven drills (three spare ones being kept in stock) is put down at 10*l.* The repairs at South Crofty (say, two drills), 5*l.* The latter item cost of repairs is really the question. If a machine costs as much in three months as the price of a new machine, and one can be obtained for the sum of 40*l.* or 45*l.*, there can be no reason why we should give double the money, and spend 25 per cent. of cost on its repairs. The systematic working carried out at Carn Brea has taught Cornish miners what is done out of the county, and what can be done. The only way to derive full advantage from rock-drills is to increase the number; the more constantly and wisely employed the less outside cost. No one who has had any experience will erect special machinery capable of driving one drill, or attempt to get the full benefit by one drill in an end or shaft. Two or four drills should be fixed on a carriage or stand easily moved away.

At the Rushen Mine, in the Isle of Man, I have the following information as their weekly average, breakage of lift or other accident not intervening. From Nov. 3 to the 10th, 21 hours were spent in actual boring, 62 holes were bored, number of feet bored 269, average hole 4·4 ft. deep, borers blunted 46, hindered from boring 1½ hour, charging and blasting 12½ hours, hindered four hours, time occupied in drawing 440 kibbles and hinderances 79 hours, ground sunk 2 fms., total hours worked 104½, lowering lift 10 hours hindered 11½, proportion of time hindered 1-7th, coal consumed by driving compressor 4 tons, two drills at work (Darlington's). From want of proper drawing power the removal of the stuff from the shaft occupied three and half times longer than boring the holes, which are in a laminated clay-slate with flats of hard spar. I have no wish or desire to deprive any man or machine of any credit due him or it. The best and most economical mode of working, the saving of a useless expenditure of capital, and the ultimate adoption of boring machinery or drills depends on truthful representations of interested parties.

Allow me in this communication to express to you my sincere thanks for the articles appearing weekly in the Journal entitled "Clausthal Mining Notes." I trust the same will be printed in the form of a pamphlet when complete, and extensively circulated among miners. Another series have also appeared on boring machinery by Mr. John Darlington, than whom few men are better able to write or advise than he, he having devoted years to the subject, and being one of the first, as well as the most modern, of patentees in this branch of machinery.—*City, Dec. 6.* H. WADDINGTON.

TRIAL OF ROCK DRILLS IN CORNWALL.

SIR,—The letter of Messrs. Loam and Sons in last week's Journal, though strictly in accordance with truth, yet does not quite put the matter in its proper aspect. The trial of drills was arranged by the committee, of which Capt. Thomas, of the Dolcoath Mine, we believe, is a member. We quite agree with Messrs. Loam and Sons that these trials are not a perfect test, still it must be allowed that a drill like ours, that can be picked up at any moment and do good work without any preparation, has its merits. One of our firm on arriving at Camborne on Thursday, and finding there was to be a trial, telegraphed to the works to send down a man and bits. The man arrived, but not the bits; still, by the aid of the blacksmith at South Roskear, we were enabled to put in an appearance, and at any rate show that the Ingersoll could do better work than the others, and that without any attention from the attendant whilst working. Our drills are well known all over the world, and we are quite willing to put one of them in any mine to run alongside the Barrow or any other drill for a month, as we are, from our experience of some years' standing in drilling machinery, perfectly certain we can do more work at less cost for repairs, and with less power, than any other drill yet in existence. In your report of the trial you say "the little Ingersoll." We have five sizes of our machines; the one used at Camborne was a 2½-in. cylinder only. Had we used one of our larger sized ones (which would still have been less heavy than those of our opponents) the results in comparison would have been much more striking. We shall feel much obliged if you will kindly insert this letter in your valuable Journal.

London, Dec. 5. LE GROS, MAYNE, LEAVER, AND CO.

ROCK-BORING MACHINERY.

SIR,—This is a subject of the greatest importance to all interested in mining, and more particularly to those interested in mining in the United Kingdom; it is, therefore, desirable that any new invention, having for its object the speedy and economical exploration or working of mineral properties, should be fully and fairly discussed by competent authorities, as well as practically tested by experienced miners. A discussion of the merits or demerits of any new apparatus may be particularly advantageous to the miner, as it will, no doubt, lead on the one hand to a full explanation of the advantages claimed for the invention, and, on the other hand, to an exposure of its weak points, and thus enable mine managers at once to decide as to the probability of an actual benefit being obtained by its adoption in the particular properties over which they have control. It would appear, by the last number of the *Mining Journal*, that the subject is one of considerable interest amongst eminent engineers, some of whom are personally interested in promoting the introduction of various power drills into the Cornish and other metal mines.

The invention of Messrs. Jordan and Son, which was so graphically described and illustrated in the *Mining Journal* of Dec. 1, appears at first sight and on reading the earlier portion of the account of its trial, made on the previous Wednesday, to be a machine of the most simple construction, and efficient in attaining its object till after a perusal of the communication of Messrs. Loam and Son, referring to the practical trial of rock-drills in Cornwall, in which those gentlemen, whose experience and engineering skill are so well known in mining circles, state that "we have never yet seen a drill that could not bore a hole of a few inches in depth more or less rapidly, but how many are there that have proved their worth by continuous and successful working month by month in the hard rock of our mines? This is the real test."

Now, I will venture to analyse the report of the new Hand-Power Drill, pointing out what I consider to be its disadvantages, not with a view of injuring the machine in the eyes of those who think well of it, but in order that the inventors, or anyone else who can do so, may reply to my objections, and so show that the apparatus is more effective than it may appear to be to some readers.

1.—The report says, "The drill affords a ready and convenient means of drilling." This point, however, appears to have been disproved by a statement in the latter part of the report—"An attempt was made to show the operation of the drill in boring horizontal holes, but as there were no facilities for tightly fixing," &c.

2.—"Two men were able to maintain fairly uniform speed of 180 to 185 strokes per minute with machines adapted to give a 100 lb. blow." Now, a 100-lb. blow cannot be obtained without the exertion of an equal or equivalent amount of strength, and as the inventors do not claim to have introduced magic into the machine, I presume the 180 100-lb. blows per minute are the result of the exertions of the two men, and I would simply ask, how many minutes can the said two men continue to produce such blows at such a rate? I would then ask, provided that "facilities for tightly fixing" had been obtained, how far the holes could be bored in (say) a horizontal position, without withdrawing the drill to scrape out the hole, and if the removal of the machine is found necessary in removing the drill to allow of the hole being scraped, or for removing the drill when it requires to be sharpened?

3.—"The S-shaped drills are employed;" this is a serious objection, as in boring in very hard rock, where power drills are required, the drills will need constant sharpening, and the S-shaped will require much greater skill and labour than is necessary in sharpening the ordinary drill used in mines.

4.—It is stated that in one minute a hole 1⅛ in. diameter can be bored in granite to a vertical depth of 3 in., but as Messrs. Loam and Son's remarks tend to show that there is nothing extraordinary in this, it will be much more satisfactory if it can be stated how long it will take two men to bore a hole (say) 3 ft., including stoppages of all kinds, in a rock as hard as that generally found in Cornish mines.

5.—The difference in speed between drilling vertical and horizontal holes is stated to be 15 per cent. in favour of the former; as far as I can calculate from the descriptions I have been able to obtain of the apparatus, I am inclined to think this is an erroneous conclusion, and that a fairly conducted test would prove far greater advantage in favour of the vertical holes. I presume the illustration represents the form of machine and stand adapted for quarrying, and that a more simple and lighter form is provided for driving and sinking in mines. Perhaps in a future number of the *Mining Journal* it may be found advisable to give a sketch of these, in order that your many readers interested in the subject may form some opinion as to their simplicity, portability, strength, durability, &c., all of which are so essential to success in actual mining operations.

Before concluding I will revert to the great importance of the subject under consideration by quoting the following extract from a recently published volume which treats at some length of the economy of mining, and alludes particularly to the newly invented rock-boring machine:—

"Amongst a great deal of improved machinery introduced in recent years may be mentioned the stone breakers, the pneumatic stamps, the mechanical jiggers, and classifiers for dressing at surface, and the Diamond drill and rock borers for exploring lodes and breaking rocks beneath the surface. In searching for mineral deposits in some geological formations the Diamond drills have proved valuable, and have been the means of saving an immense amount of labour and cost. But the most important of modern inventions, both as to the saving of labour and time, has been the rock-boring machine, which will enable a level to be driven at no less than nine times the rapidity with which it can be done by hand-labour. The motive power of a steam-engine is conducted by compressed pure air from

the surface; the air is set free in the mine at the exact point where its force is particularly required—in the end of the level which is being driven, or at the bottom of the mine where the shaft is being sunk, thus substituting for the heavy, smoky, and otherwise impure atmosphere of the mine the cool pure air of the upper surface, to the great benefit of the miner's health, and the more effectual ventilating, lowering of the temperature, and purifying the atmosphere of the deeper workings. The further trials of this machine will be looked forward to with great interest, not only by mining men, but also by those who take an interest in the mining population, because any expedient which renders more pure the confined air of the deeper levels tends to preserve the health of the men, and increase their ability to perform a larger amount of physical labour. From a purely mining point of view the great desideratum of course is the saving of time, and if the machine fulfil only a part of the promises made on its behalf in this respect, it will be largely used in the metal mines of this kingdom. Everyone engaged in business fully understands and recognises the importance of a saving of time in the carrying on of the various operations incidental thereto, but it is doubtful whether anyone not practically acquainted with the economy of mining can thoroughly appreciate the advantages such a machine would present in carrying on extensive operations. To put the case more clearly it may be stated in this way—Fuel, as is well known, is largely consumed by the machinery necessary for working mines, and whether a shaft is sunk or levels driven quickly or slowly the same amount is necessary, and must be consumed, to keep the water out of the mine, and a certain number of engineers, stokers, pitmen, and watchers are employed, whilst the managers' and agents' salaries remain the same. With a given number of men a certain amount of work (say, a cross-cut driven to cut a certain lode, a level driven through a bunch of ore, a shaft sunk a distance, or a quantity of ore ground taken away) may be accomplished in one month by an improved rock-boring machine, which under the old system would have occupied a period of nine months with the same number of men employed. The enormous advantage which would be gained is obvious, and it would require no difficult calculation to decide the amount of time saved and the consequent saving of fuel and salaries. Regarded from an economical point of view, the subject is one the importance of which cannot be over estimated or exaggerated, and when the machine gets extensively into use it will be a material aid to the metal-producer in this kingdom to outstrip all other tin, copper, and lead producing countries, even at the present low price of metal,"*

* "Investor's Hand-Book," by Charles Thomas, F.S.A., F.G.S. Published at 3, Great St. Helen's, London.

As far as the miner is concerned the perfecting of the rock-boring machinery is of vital importance, and any step towards that end, however slight, should be regarded with approval, and that it may ultimately reach that state of perfection which will enable the metal miners of this kingdom to compete successfully with those of other tin, copper, and lead-producing countries is the ardent desire of—

Dec. 7. A CAUTIOUS MAN.

ROCK-BORING MACHINES.

SIR,—The late trials of rock-boring machines at South Roskear may be very interesting to a holiday party, but practically are of no service whatever. Such trials only too frequently help the unscrupulous to propogate falsehood, either by verbal statements or advertisement. Although I do not think the Barrow drill is the best in the market, yet its failure at the South Roskear exhibition is of no moment whatever. Perhaps the drill was badly clamped to the bar, or the valve was not tight upon its face—either circumstance would account for the result. The absence from the exhibition at Camborne of the Carn Brea and Darlington drills is to be regretted, particularly after the statement which appeared in the Journal of Nov. 24 relative to the duty done by the latter drill in the Isle of Man. If I understand the statement it amounts to this—that two Darlington drills secure five times the speed of hand labour, at less than one-half the actual cost, and materially increase the earnings of the miners.

NEMO.

HAND-POWER ROCK-DRILLS.

SIR,—I read with considerable interest the description of Messrs. Jordan's hand-power rock drill, given in last week's Journal, and can quite understand that for surface work it would possess several advantages, assuming the statements concerning it to be true, as compared with the ordinary jumper and mallet generally employed. It will be obvious that if two men can give 180 blows per minute, it is fully three times as fast as could be expected by hand, and neither 60 blows per minute by hand nor 180 by machine could be kept up for more than a minute or so. But there is one thing I much doubt, and that is whether the blow which the rock receives in hand boring is not considerably more than a 100-lb. blow. A certain portion of the force is, no doubt, consumed in flattening the head of the jumper, but the way in which the head is flattened, when only a few feet has been bored with a carefully tempered drill point, shows that the force of the blow must be great. There is, however, the great advantage with the hand-power drill that the two men work simultaneously, so that it may be presumed that a maximum of force is concentrated in the drill, whilst in hand-boring only one can strike at a time, the other being engaged in holding the jumper and turning it in the hole. A minute's trial is, however, very little criterion whether the result be favourable to hand or hand-power drilling. What is required is a trial for (say) a week, or still better for the driving of a couple of fathoms of ground; and if this supported the claim of the inventors that double or treble speed is attained, the use of the hand power system would quickly become general.

But the difficulty which I see with regard to the machine is that no holes could be bored with it except in the middle of the face. To get anywhere near the top, bottom, sides or corners of a face would be altogether out of the question, so that if it be proposed to use the machine underground some modification would be necessary. In putting in holes by hand, as was, indeed, shown in Mr. Darlington's letter in the Journal of Nov. 24, some must of necessity be near the perimeter of the face. Take Fig. 17 for example; the hand-power drill could put in the three central holes easily; it would also be possible to put in the seven around them with the drill; but as to the fourteen outside holes, and especially the four corner holes, the hand-power drill would be wholly inapplicable; and the holes which would thus have to be drilled by hand are just those which take most time by hand. If hand-power drills are to be used we must have something that will make corner and perimeter holes as readily as central holes, and this I have not yet seen.

Redruth, Dec. 4. H. J. C.

AIR-COMPRESSING MACHINERY.

SIR,—In the description of an air-compressor, the invention, I believe, of Mr. Hathorn, published in the *Mining Journal* a few weeks since, it was stated that the air was compressed to 90 lbs. on the square inch, whilst the steam used was 45 lbs. This statement is misleading in the highest degree. What we require to know is how much steam at 45 lbs. pressure was used to produce each cubic foot of air at 90 lbs. pressure, or what would have been still more satisfactory, how much loss resulted from using the compressed air as compared with using the steam direct.

If we are to judge anything from a report in the *Mining Journal* the experiment should be made thus:—Let three of the Ingersoll drills be set to work with the steam direct at 45 lbs. pressure, to make three holes each working two minutes, or three minutes if preferred. Let the work done be noted. Then let the bits be changed for exactly similar bits, and the drills shifted on the same stones. Now, let the three be worked with compressed air for the same time as in the steam test, and upon noting the result it will be found that only two-thirds of the work will be done—that is, if 3 in. by 7½ in. be done with the steam direct, equal to 22½ in. in all; then when the air compressor is used only 3 inches by 5 inches = 15 in., will be done with the same consumption of steam.

Dec. 5. A. H.

ROADWAYS, AND FOOTPATHS.

SIR,—Permit a very brief reply to the letter of Mr. Young, of Chiswick, which appeared in the Journal of last week. I am much obliged for the gentleman's good opinion, but am not an engineer. I often walk, however, and sometimes ride, and am, at all events, competent to form a common sense judgment of the ways I pass over; and I have observed, as everyone else must have done, the state of the roads and footpaths during the recent weather. The paved streets have been in pools of water, and those laid with asphalte and wood have been thick with mud, of the consistency of paste, while horses have been down in every direction, especially in the main thoroughfares. The flagways are so constantly out of repair, and it is so expensive to relay them, that they have been in pools of water, I think rather more than the paved centres of the streets. The preparation of which Mr. Taylor is the agent or possessor obviates these unpleasant concomitants of both roads and paths, constituting a level way, not subject to ruptures, not liable, therefore, to receive those large deposits of rain which everyone complains about, and which at night, at all events, causes many a wet foot on the part of those especially who wear light boots, which many are obliged to do.

Garden paths, park broadways, and approaches, which are now generally macadamised, the dirtiest of all contrivances, can be made as smooth and clean by this cohesive as the most delicate foot could require. It is, therefore, worth the attention of Mr. Young, if he wishes to have the paths in the neighbourhood of Milton Lodge and Bedford Park clean, level, sound, and durable.

Mr. Young asks for details as to this cohesive. Those, I presume, are the secret of the patentee, but if Mr. Young will call upon Mr. Taylor, 447, Strand, he will receive the information requisite to form an opinion of the utility and adaptation of the material. Several individuals and corporate bodies have made enquiries since my letter appeared in the Journal, showing the wide and general circulation of your able and diversified publication.

As to the economy of this cohesive for pathways it is about one-third the expense of good Yorkshire flags; and I am given to understand that it is comparatively very cheap for roadways, but this is a matter for those to ascertain who mean to do business. I have no interest in it except as one of the public. Mr. Young refers to it as an "unknown and untried substance." It certainly is not so well known as it ought to be, and will be, but it is not untried. In Sheffield, and other places in Yorkshire, it has been already laid, and has given entire satisfaction.

London, Dec. 5. EDWARD HENRY NOLAN, Ph.D., LL.D.

THE BLANTYRE COLLIERY EXPLOSION.

SIR,—This dreadful disaster will, no doubt, occasion general attention to be directed to the cause of such occurrences, with a view to prevent, if possible, such events in the future. The action of the miners and their friends will, no doubt, be in the direction of further legislation. It is, we think, very probable that they will seek to get an enactment that compensation shall be recoverable in cases when it is presumed, or proved, that ordinary care and skill have not been exercised.

The provisions of the late Mine Act are so good that it is scarcely possible to improve upon it, but it is evident that the Act can be to a great extent ignored. No doubt the Inspectors are to a great extent responsible for the carrying out of the Act, but they cannot be expected to inspect the collieries in their circuit often, and they must, of course, studiously avoid any interference, so as to take the management or direction of any mine to the smallest extent. It is, we know, a difficult point, but we are strongly inclined to the opinion that it would prove of great advantage to give increased power to the Inspectors. If a ship is found unfit to proceed to sea, it can be prevented sailing, and, no doubt, lives are saved in many cases. Why not treat mines in a similar manner? and if an Inspector finds that, in his view, a mine is worked in an unsafe manner, give him the power, with the sanction of a Secretary of State, to stop the working of such mine. If the Inspector had such a power we do not suppose that it would be liable to abuse; the mere fact that he had such power would, there is little doubt, have a powerful effect in deterring managers from infringing the Act, and thus prevent his power from being exercised.

It is pretty certain that the last Act has been, to a great extent, set aside in the matter of certificated managers; the Act contemplated the appointment of a regular certificated manager to officiate daily at each colliery, but this did not suit all parties, and that regulation has not been followed out literally. It is true that a great army of certificated men are to be found about, but they are not certificated managers, they are simply underviewers, overmen, &c., as before the passing of the late Act.

VIEWER.

Newcastle, Dec. 5.

THE TELEPHONE.

SIR,—Below I give a free translation of a lucid and well-written article which recently appeared in the *Deutsche Reichs Zeitung* on the Telephone. The novelty of this wonderful instrument, which seems destined to play a part perhaps not second to the telegraph itself, and the interest taken by everybody in its origin and powers, is my apology for transcribing for your valuable Journal the article in question.

The writer of the article, after referring briefly to some simple experiments illustrating electric phenomena, goes on to say:—To make the matter clear to our readers we must call to mind one or two facts which have long been regarded as the foundation of the science of acoustics. Every sound, every musical note, every word is perceptible to the ear only by the vibration of the air propagated to the auditory nerves. For this purpose there is stretched in the ear a delicate membrane, the tympanum, which vibrates with the motion of the air, and this motion conveys to the brain, through the auditory nerves, a consciousness of what is taking place in the outer world.

The principle of vibration is, therefore, the foundation of our knowledge of the sense of hearing, and on the development of this principle rest all our insight into the science of acoustics. Although it has long been known that sound-waves may be conveyed to a distance by a suitable instrument, as the speaking-trumpet, and be again collected and rendered more easily perceptible by another contrivance, the ear-trumpet, yet it was not until the last decimal that it occurred to anyone that the vibration of sound-waves might excite the electric current in a wire conductor, and that by its means sound-waves might be reproduced which should make perceptible to the ear at one end of the wire sounds generated by the mouth at the other.

Such a contrivance, invented by the assiduous German philosopher, Prof. Paul Reiss, is the foundation of telephony, which in a most marvellous manner has been amplified and brought to an astonishing degree of perfection by an American inventor.

The invention of Prof. Reiss consists in the following arrangement:—At a station is placed a small box, of the size of an ordinary cigar-box. On one side is a trumpet-like opening, into which one may sing; on the cover of the box, over an opening about the size of a half-crown, is loosely stretched a fine animal membrane, which is set in motion by every note sung into the side opening. In the middle of the membrane is glued a thin disc of metal, which is light enough to partake of every movement of the membrane. Suspended quite close over the disc, and attached to a metallic spring, is a second disc of metal, the two coming into contact with every vibration of the underlying disc.

If now a note be sung into the mouthpiece the suspended plate or disc dances with the same rapidity as the sound-waves follow each other. The two discs are placed in connection on one side with an electric battery, and on the other with a telegraph wire reaching to the distant station. By the contact of the discs an electric current is induced, which passing through the wire produces an effect which calls forth in the ear at the end station the same note which was sung into the mouthpiece at the starting end. At the distant station is a second box resembling the first. On the cover is fixed a small iron rod, which is wound round with a pretty thick layer of insulated copper wire. According to the well-known laws of electricity and magnetism this rod or bar is converted into a magnet during the passage of the electric fluid through the encircling wire, and loses this property as often as the electric current is interrupted.

As now the notes sung into the first box produce successive electric contact of the two discs, so in corresponding manner is the iron bar at the end station converted alternately into a magnet and the converse. The bar partakes, therefore, of equally rapid vibrations with the air at the first station, where the notes are produced, and its vibrations excite again similar vibrations of the air in the box in which it is placed, and these are communicated so distinctly to the ear that one can recognise what melody is being sung at the first station.

This is the telephone of German origin. It has not escaped the observation of scientists, and has excited a good deal of attention amongst the public as an interesting phenomenon. The fact has also been recognised that, supposing it possible to procure a membrane so fine, and at the same time so sensitive as that of the human tympanum, one would be in a position not only to telegraph to a distance simple notes, but whole concerts.

It may have occurred to some that spoken words might in a similar manner be telegraphed, but in this there would be difficulties of a peculiar kind, which cannot be considered so easy to be got over.

It must be confessed, after all we have said about the telephone of Prof. Reiss, that the present invention surpasses the other in an extraordinary degree, and every friend of the Fatherland must be put to the blush by the reflection that no German "Techniker," or scientist, can boast of such an invention. The telephone is, however, not the only invention which, born in Germany, has come back to us in an improved form from foreigners. The telegraph, which rules the world, is, indeed, also a child of German brain, which not until long years of non-recognition found its reception in its birthplace. No wonder, then, that it goes similarly with the telephone, which possibly is destined to place telegraphy on quite a new basis.

The article goes on to describe and to eulogise the telephone of Prof. Graham Bell (it would make this letter too long to transcribe the whole article), remarking that its simplicity is the most wonderful thing about the whole apparatus.

JOSEPH GARLAND.

Mehlem am Rhein, Dec. 5.

INSTABILITY OF NITROGLYCERINE COMPOUNDS.

SIR,—I think it necessary to begin my present letter by asking "Caution" by what rule he thinks I imagine myself entitled to a monopoly of your pages? It certainly cannot be from the frequency of my letters, seeing it is just one year and ten months since I presumed to write to the Journal, as you know I am not a regular correspondent, but I dare say you know I am a regular reader. I am surprised that "Caution," who imagines he has aroused my spleen, should write such bosh as your kindness in admitting his letter to your pages. I as a constant reader of the Journal am often surprised at the very liberal manner in which you allow your pages to be the medium of such trivial complaints as I think often appear. Now, Sir, I do not intend to answer or comment upon the letter of "Caution," since he has not attempted to contradict any assertion I have made, but who, seeing that his letter has called forth a reply, hastens to write a rejoinder; and, by way of easing his ("Caution's") mind, quotes that some long time ago some person suggested I should have signed myself "Unfair" instead of "Fair." This I submit is a matter of opinion.

I here beg to say that I am in no way whatever connected with "Fair Play," I am simply "Fair," with no play about it; but I do certainly think, if what he says is true, it is a very disgraceful state of unfair business (I cannot call this play), and which either company or agents ought to be thoroughly ashamed of.

I quite agree with "Fair Play" that tonite can stand and will hold its own against any dynamite that is made for the market; weight for weight it is equal to the regular standard—75 per cent. nitroglycerine and 25 per cent. Kieselguhr—and price for price superior.

I will now notice the letter of "Dynamite," and happily say I quite agree with him, especially when he says "Major Majendie, Major Ford, and the entire staff of military officers whose duty it is to superintend the use of explosives, will confirm my statement that with every nitroglycerine compound which has been brought into the market there is a considerable liability of the exudation of the nitroglycerine," and this I must say I believe to be a correct and fair statement. Now, if this be true, I would "caution" all users of explosives not to use any nitroglycerine compound whatever, for in the winter it will freeze, in the summer it will exude, if it gets soaked with water, and will become, "like sausages in gravy," as so graphically described by Major Majendie in his report of Sept. 1, 1876. I strongly urge this, so that we may not have to try to account for any more, perhaps inexplicable, explosions of dynamite, especially when there is in the market a "tonite" which has not one grain of nitroglycerine in a ton, which, in fact, is not in any shape or form whatever a nitroglycerine compound. I will now conclude, saying I hope it will be another year and ten months before I feel it necessary to write, but I will content myself by being your constant reader.—*Faversham, Dec. 5.* FAIR.

THE SEPARATION OF SILVER FROM COPPER.

SIR,—The throes of labour are past, and veritably the mountain has brought forth a mouse. In April last the announcement appeared of a patent granted to Mr. E. L. Mayer for "improvements in treating cupreous solutions for the purpose of separating silver," and metal extractors, knowing that the brilliant abilities of that chemist, backed up by the vast resources of the Tharsis Sulphur and Copper Company, had been for some years past devoted to the discovery of a new silver extracting process, waited with eager expectancy until in due time the secret would be revealed by the publication of Mr. Mayer's specification. Not the less intense was this expectancy from the fact that during Mr. Mayer's investigations his friends, presumably in his confidence, freely prognosticated the advent of a process well worthy his reputation as a chemist and the prestige of the Tharsis Company. But a letter in the Supplement to the *Mining Journal* of November 24, signed "Freundin," and headed "Separating Silver from Copper with Glue," reveals what? We shall see. But first "Freundin" begins by alluding to many curious things he has heard of, and amongst these it will puzzle him to find anything more curious than the title he has given his own letter describing Mr. Mayer's process, for whatever the process is it certainly is not one in which silver is separated from copper with glue. "Freundin's" letter is really little else than a reprint of Mr. Mayer's specification, and taking the latter as our authority we find that the "invention consists essentially in adding glue . . . and an iodide . . . to the cupreous solution or copper liquor in such a manner that the glue and the iodine may combine with the silver present in the cupreous solution, and so form the new chemical compound, which separates from the cupreous solution as a precipitate."

Further on is an analysis of concentrated cupreous solution made in the wet process of extracting copper containing 004 per cent. of silver, and directions are given to add to about 240 cubic feet of these liquors "1 lb. to 2 lbs. of glue and a solution of . . iodide containing about 12 ozs. of iodine," and subsequently "a solution containing ¼ lb. to ½ lb. of tannin . . principally for the purpose of expediting the precipitation of the remainder of the compound of silver, glue, and iodine formed in the liquors." Thus we find that the separation is neither effected by glue alone nor by glue and tannin together, and it would certainly have been a novel and curious improvement had one or both of these alone been suggested. But with the glue there is to be added an iodide in proportion chemically equivalent—as anyone may satisfy himself readily by calculation—to the silver in the quantity of liquor operated on. I am afraid when the proposal is fairly looked into that the glue will be, without hesitancy, put down—so far as is essential to the precipitation of silver from copper liquors—as analogous to the flint in the "flint broth" of the story, whilst the iodide, insignificant as it appears in "Freundin's" letter, is really the essential ingredient of the mess.

In 1870 Mr. F. Cundet obtained a patent for "the separation . . . of silver from solutions containing chlorides of silver and copper obtained in the hurried treatment of copper and silver ores by precipitating the silver in the state of iodide of silver, a substance practically insoluble in such copper liquors." The method of procedure is simply the adding to the copper liquors a solution of an iodide containing iodine chemically equivalent to the silver in the copper liquors, and after allowing the precipitated iodide of silver to subside decanting off the desilverised solution. Here, as in Mr. Mayer's process, iodine is added, but without the glue and tannin, and with most satisfactory results, as witness the many thousand ounces of silver that have been and are being separated profitably from copper liquors by its means. If Mr. Mayer's use of glues and tannin is meant to facilitate the separation of iodide of silver after its precipitation from strong liquors without the slight dilution generally adopted after the principle well known to housewifes, brewers, and others, of clarifying liquors by gelatine, and to chemists of the precipitation of the latter by tannin, it is unfortunate for the validity of his patent that he did not confine himself to these in his claim.

By a principle well recognised in patent litigation, whatever claim Mr. Mayer might have had to a patent for the application of gelatine and tannin to the rapid clarifying of copper liquors is nullified by

his claiming the use of an iodide, for which Claudet's patent of seven years earlier is still in force. Notwithstanding the "glorious uncertainty of the law," and particularly of patent law, and Mr. Mayer's so-called discovery of a new compound or compounds in which silver, certain nitrogenous substances, and iodine are chemically combined," I venture to affirm that it will be difficult to find a jury who will not be convinced, after investigation, that in the new process, as in the older, the precipitation of silver depends on the formation of the iodide of that metal, the insolubility of which in solutions of composition similar to copper liquors had been demonstrated by F. Field years before the date of Claudet's patent, and the fact had been given effect to still earlier, in at least one patent (F. M. Lyte, No. 1759, A.D. 1853) for the separation of iodine from solutions containing iodides and chlorides by means of chloride of silver.

METAL EXTRACTOR.

MINING AT THE CAPE.

SIR,—The danger of holding mining shares with borrowed money was exemplified last week by the fall in Cape Copper shares. Let the margin vanish and at once the shares are thrown on the market. Anyone can calculate for himself that the dividend can fall but little short of that of several years past, but bankers do not go into such nice calculations, and only consult the Stock Exchange List, in which the shares were quoted some 8*l.* or 10*l.* lower than last year. Bankers do not look at the increased percentage in the ore, or are familiar with the intricacies of the standard; it is useless to argue with them when the margin runs short. It is to the "pawned stock" that we owe the extreme fluctuations in Cape Copper shares. To hold stock paying 10 or 12 per cent. with borrowed money at 4 or 5 per cent. may appear good business, but we have seen that it is not without its risks to the speculator. Moral, never hold shares unless you can pay for them.

W. W.

London, Dec. 3.

THE CAPE COPPER MINE—A PROBLEM.

SIR,—Which is the better speculation—copper, or these shares? Say, I go in for copper at 64*l.* for Chili bars, a price about as low as it has ever touched. It may remain there for months, and leave me to pay interest and charges, and lose my money. If I buy these shares at 32*l.* or 33*l.* I am, at all events, tolerably sure of 3*l.* dividend, or 9 per cent. for my outlay—and may say practically quite sure—without any rise in copper. If copper rises to 70*l.* I make, after paying interest and charges (say), 5*l.* on every 64*l.* I embark, but then I am as sure of making 7*l.* or 8*l.* on every copper share bought at 32*l.* I think I stand in little fear of contradiction from any unprejudiced observer.—*London, Dec. 5.*

C. D.

THE RICHMOND MINING COMPANY.

SIR,—I should feel grateful to any correspondent who would give information relative to the Richmond lawsuit. Is it to commence in a year, month, or week? If the time cannot be mentioned definitely, it can at least be approximated by those in authority who ought now to be in a measure acquainted with the working of the American law courts, the number of cases taking precedence of the Richmond, &c. It would be much better if the time were known—I mean publicly—as that would prevent the wild speculation certain to be indulged in if the case is opened suddenly without any warning.—*London, Dec. 5.*

ANXIOUS.

THE RICHMOND MINE.

SIR,—The statements on this company's affairs, published in last week's Journal, I conclude are official? I notice no indications of their being extracts from other papers. As a shareholder in the Richmond Company, I have been daily expecting to receive the report from the directors, the heads of which appear to have been furnished to the Journal. How the figures given in the Circular of Nov. 6 are to be reconciled with those appearing in the Journal I am puzzled to know. On the face of it, the circular looks like a misrepresentation. The explanation will be interesting to others besides

A SHAREHOLDER.

NEW QUEBRADA COMPANY.

SIR,—The two letters signed by the Chairman of this company, and which appeared in last week's Journal, are so ambiguous in expression that if the instructions sent to Venezuela are framed on the same model there is little cause to be surprised that great mismanagement has resulted. The letter from the Chairman to the Stock Exchange Committee is just as devoid of truth as that of the "Large Quebrada Shareholder," whose statements it professed to contradict. It may be that a letter written at the mine on Oct. 27 could not be in London on Nov. 21, but what the shareholders wish to know is not that, but how far the directors can confirm the very circumstantial statement made by the shareholder in question that at a particular part of the mine "a large and very valuable lode of high-class ruby ore, much of it giving 40 per cent. of copper, was opened up." Are we to understand that until Nov. 29 the directors had no knowledge whatever that a rich lode had been discovered, and that it is left to individual shareholders to obtain in advance detailed information which the directors may or may not receive during the following month or six weeks? Again, it is probable that all the statements made by a large shareholder as to the proposed new arrangements for working the mines may not be accurate, but "perhaps now it may be the duty of the directors" to say whether there is not truth in some of them, and which, if there is really no truth in any of them the sooner the shareholders are distinctly informed thereof the better, that they may act accordingly. I agree with a fellow-shareholder, who writes to me in these terms:—"Patience with directors, and making every allowance for them, is all very well, like many other things, in moderation, but when they appoint men to act for them utterly incompetent, and take no means to look after them and see that the labour paid for is being done, who, instead of stopping the import of poor ore immediately and recalling their agents, allow it to be shipped for months, and who have the effrontry to publish such a quibbling letter as that inserted in the *Mining Journal* of Saturday, then it appears to me that the time for exercising patience has passed, and that some change in the management should be promptly made."

London, Dec. 6.

A YOUNG SHAREHOLDER.

VIRNEBERG COPPER MINING COMPANY.

SIR,—I was very much surprised a few days since to receive a circular from a firm of sharebrokers, announcing that they were open to sell some fully paid-up shares in this company at 35*s.* (5*s.* below par). I could understand this course being taken if the company were in want of working capital, but at the statutory general meeting the Chairman considered there was sufficient capital subscribed to carry on the mine; besides, circulars were issued after this meeting offering more shares at par. It seems a rather strange procedure to depress the shares in this way, especially when their value has not yet been ascertained in the open market, and considering the very satisfactory way in which the mine is turning out. Should it be that further capital is required, money might be realised on the large reserves of copper ore lying at the mine.

A SHAREHOLDER.

DOLLAR RECOVERY COMPANY.

SIR,—I had a few days ago a prospectus of a company now in process of construction for renewing a search after the lost cargo of dollars now lying under the sand near Gunwallow, Cornwall. Many years ago a search was made and some dollars were taken up, but on that occasion the appliances were defective, which will account for the failure. The progress of mechanical invention since that date has been such as to warrant a belief that the measures about to be taken will be successful in recovering this treasure-trove. The amount is very considerable. The company have a lease, I believe, from the Crown to work for this object. Having mislaid the prospectus I do not remember the names of the persons constituting the executive, but I do remember that Mr. Argall, late deputy-purser and accountant at Great Wheal Vor, is to be the purser of this company; so that whoever may feel inclined to invest a portion of their savings in a speculation which promises success may be sure that their money will be properly and economically expended.—*Truro, Dec. 5.*

R. SYMONS.

COST-BOOK SYSTEM—TRELEIGH WOOD.

SIR,—Mr. T. B. Laws, in what he calls his *resume* of the whole question at issue in this case, evidently seeks to justify his own conduct in the matter, and to make it appear as simply a question of custom that was in dispute. But there is something more than this involved; and as I paid the 14*s.* call Mr. Laws mentions upon shares which I afterwards relinquished, I may say in utter disgust with the whole proceedings, and as I know the whole facts of the case I crave your permission to reply to Mr. Laws. That gentleman says that prior to a meeting held in February, 1876, the largest shareholder in the mine intimated that he should propose a call sufficient to meet the liabilities of the mine; this is correct, and it is also true that this proposition was not in accordance with the views of other shareholders. It had been understood that if the 56 or bottom level should not show any improvement upon the upper levels it would not be advisable to continue operations at the mine. In February, 1876, the level was very unpromising, and the feeling on the part of some of the shareholders was to give it a further three months trial, and if no change for the better took place in that period to abandon the mine, and, therefore, no such call as proposed was immediately necessary, as in the event of the mine being stopped at the end of three months the plant would be sold, and a less call than that proposed would be sufficient to wind-up the affairs of the company. As the largest shareholder would not listen to this certain shareholders relinquished their shares before the meeting was held. Immediately after the meeting other shareholders paid the 14*s.* call, and relinquished their shares. The then purser instructed the manager of the mine to value the machinery, &c., on behalf of the company, and an independent person was also sent to value on behalf of the relinquishers. Both valuations set down the plant, &c., as being worth about 2880*l.* Subsequently the largest shareholder instructed the purser to convene a special general meeting to pass resolutions for winding up the company, and in the meanwhile to stop all operations at the mine. The special meeting was held on February 24, 1876, when the largest shareholder determined to go on with the mine. At this meeting there were present—the largest shareholder, a friend of his, also holding a considerable interest, a party who had only become a shareholder about half an hour before the meeting, and five other shareholders, of whom I myself was one.

After the business of the Special Meeting was concluded, an adjourned general meeting was held (in both instances the largest shareholder taking the chair) when a series of resolutions were proposed and seconded by the three first-named shareholders and declared carried by the Chairman, but not one of the resolutions was put to the meeting in a formal manner, the presence of the other five shareholders was wholly ignored; one assent or dissent was not once asked for, and we might as well have been absent for any voice we were allowed in the proceedings. I give you my word of honour there is not the slightest exaggeration in what I state. The largest shareholder proposed, and the newly-become shareholder seconded, that the largest shareholder and his friend holding the considerable interest should be a committee of management. This resolution the Chairman declared carried. It was also in like manner resolved to dispense with the services of the purser, and Mr. Laws was appointed purser and secretary to the mine. It was further resolved to accept the relinquishments sent in, and "that so soon as such relinquishing shareholders' liability could be made up that a copy of the amount be sent to them, and a demand made upon them for their share of the liabilities of the mine to the end of the month in which the shares were relinquished" The draft of this and all the other resolutions was in Mr. Laws' handwriting, so it is only reasonable to assume that the extraordinary proceedings were carried out under that gentleman's advice.

The late purser was advised that the proceedings of the two meetings were irregular, and under that advice refused to hand the books, &c., over to Mr. Laws without an indemnity, which, after some delay, was given him. Immediately on Mr. Laws receiving the books that gentleman made out an account showing each relinquisher's share of the liabilities, with a demand for immediate payment thereof. He also made out a statement of the assets, valuing the machinery, &c., at about 2500*l.*, showing each relinquisher's proportion of the same, to be paid him at the expiration of two years. In the latter statement was included a sum of 300*l.* unpaid calls, which the relinquishers were to receive their proportion of at the end of two years "if the amount were paid. Of this amount (300*l.*) 270*l.* had actually been received at the time the account was made out. The relinquishers disputed these accounts. They were ready and anxious to settle the matter at once, upon a fair and correct account made out according to custom, and which the account presented was not. Mr. Laws and party, in regard to the valuation of the machinery, proposed to send a second valuer on their own behalf, the relinquishers also to send another on their behalf; the relinquishers agreed to this, and immediately after they had done so so, and without the proposed arrangement being carried out, Mr. Laws and party served the four defendants in the late trial with writs of action in the Court of Exchequer, to recover the amounts demanded by Mr Laws, as set forth in his statement of accounts. The relinquishers determined to defend the action which, however, was abandoned by Mr. Laws and his party, who subsequently commenced proceedings in the Stannaries Court. Notice of trial was given for March, May, and August last, and each time countermanded. On the 22nd of last month the case was tried before a jury, and, as is well known, resulted in a unanimous verdict for the defendants. We have seen much abuse poured upon the Stannaries Court, but after reading my simple statements I think every adventurer in a cost-book mine has cause to feel thankful that we have such a court.

Mr. Laws has occasionally been severe—very severe—in the columns of the Journal upon Cornish mines managed by Cornish pursers and merchant committees but how do he and his committee stand in this matter of Treleigh Wood? Some shareholders relinquished shares in the ordinary way; a valuation of the machinery is forthwith made by the manager of the mine on behalf of the remaining shareholders, and an independent person values on behalf of the retiring shareholders, with a view to a settlement of account between the parties, according to custom; a change of pursers takes place; the new purser repudiates the manager's valuation, and substitutes a lower one; he makes out an account in accordance with his own view of cost-book custom, and which account is manifestly incorrect; he demands immediate payment of a considerable sum of money, and, when that demand is not complied with, refuses any arrangement, and proceeds to enforce his claim in a court of law Mr. Laws may still entertain unfavourable impressions of Cornish pursers, but I feel certain there is not one of them—nay, I will venture to say there is not a person in Cornwall, purser or no purser—who would have acted towards these Treleigh Wood relinquishers as Mr. Laws and his party did.

Mr. Laws tells us that in his evidence at the trial he admitted he had relinquished shares in mines, had objected to low valuations and had the value of the machinery, &c., placed as an immediate set-off against his liabilities, and had been called upon to pay the balance only. He says this was done through the courtesy of the pursers. It was a simple matter of business, arranged according to custom by pursers who were well acquainted with that custom. If anyone will take the trouble to refer to the West Briton of the 29th ult. he will there see a long account of the trial. Mr. Laws in his evidence is reported to have said he had been connected with mining for 30 years, and had great experience as purser and manager of mines, and it had been his practice to call upon the relinquishing shareholder to pay his portion of the liabilities at once, and not allow the value of the materials as a set-off. In cross-examination Mr. Laws said he had relinquished shares in South Wheal Frances Mine, he had not paid his portion of the liabilities, and he had, he thought, claimed to have his proportion of the value of the machinery set off against his portion of the liabilities. On his own evidence, therefore, Mr. Laws' practice in other persons cases of relinquishment has been to demand immediate payment of the relinquisher's portion of the gross liabilities, and not to allow a share of the assets as a set-off; but in his own case he has claimed his share of the machinery, &c., as an immediate set-off against his share of the debts. So that at the time Mr. Laws was pursuing the Treleigh Wood Mine relinquishers for their share of the gross debts of the company, and refusing a set-off of the value of the assets, he was himself a relinquisher in another mine, and claiming and receiving an account made out upon the directly opposite principle.

That the Treleigh Wood relinquishers were pursued in a spirit savouring of vindictiveness will, I think, strike everyone who reads these simple facts. Harsh as has been the treatment those gentlemen have received it has shown to every shareholder in a cost-book mine what his rights and claims are in the event of his retiring from the adventure, and he will be able to effect that retirement free from the expense and annoyance to which the Treleigh Wood relinquishers were subject. "Miner," in last week's Journal, says that if the principle contended for by Mr. Laws and party were admitted there would no longer be either security or protection for a retired shareholder. This is undoubtedly true, and it were better to close every mine in Cornwall than that such a principle should rule, for no person who adventured in a mine would be safe from ruin by vindictive and litigious wealth. Even an existing shareholder might be unwittingly made a party to almost interminable law proceedings by one or two large and wealthy shareholders bent upon adopting every means to enforce payment of a claim based on their own particular views of custom. Fortunately, however, a jury of Cornishmen have decided that this cannot and must not be. Henceforth there is equal protection for the shareholder who retires and the shareholder who remains.

D.

London, Dec. 5.

MINING COST BOOKS, &c.

SIR,—When I was a young man, and attended mine meetings—commonly called "account meetings"—it was an invariable custom for the purser to lay on the table the cost book, merchants' bills, and vouchers for the inspection of the shareholders. This was a rule the adoption of which did not imply any want of confidence in the purser, who did it from his own volition, without the request of the shareholders, because he wished them to be satisfied as to the entries, and the prices charged for materials. I believe that such a rule is still generally followed, but I find that at Carn Brea Mine that rule is not observed. I suppose that Capt. Teague thinks himself so much above ordinary pursers and so far above suspicion that the shareholders shou'd not ask or desire the opportunity of examining the accounts. In this I consider Capt. Teague is wrong. However upright he may be (and I do not question his uprightness) he should give his partners the opportunity, unasked, of looking into their joint affairs at their quarterly meetings. At the last meeting at Carn Brea the books were brought in, an abstract read, and then the shareholders were asked to pass the accounts, which being quickly done, the books were at once removed to the safe, the opportunity for inspection being intentionally excluded. A discussion, raised by Mr. Heard, of Truro, ensued, when Captain Teague contended that as he did his best for the mine it would be waste of time to go into particulars. With reference to the large balance due to the bankers, which had been concealed from the shareholders till the meeting held in September last, Capt. Teague said that if he had made known the real state of the accounts most, or many, of the shareholders would have relinquished their shares. He had felt assured that the balance would be reduced without any calls upon the company, and that assurance is now being justified. I say that that argument is not a good one, inasmuch as Captain Teague had no right to that reticence. As an agent of the company it was his duty to place before it, at the periodical meetings, a full balance-sheet of the company's affairs, and not to lead them in the dark into a condition bordering on insolvency. The shareholders have been wont to place great confidence in Capt. Teague, and his expression of confidence in the prospects would prevent the relinquishment of shares; they have too much confidence in his judgment to resign hastily. "Above-board" proceedings are best in most affairs, and particularly so in mining, however honest a purser's intentions may be. A shareholder, called Mayne, said at the meeting that Mr. Heard had "done more injury to mining than any man in the county." Such a speech may have pleased Captain Teague, but it is utterly false. If he had said that Mr. Heard had done "good" instead of injury he would have said the truth. Mr. Heard has had the pluck to do what no other man had the manliness to do—to insist, as he did at West Basset, on the production of a true balance-sheet and the bankers' pass-book, which when produced showed that the company owed the bankers 25 000*l.*—a fact kept from the knowledged shareholders till elicited by Mr. Herad; and this exposure had the effect of bringing to light the facts that at Carn Brea they owed 28,000*l.*, and at Tincroft 25,000*l.* to bankers. I say to do that was a right good act by Mr. Heard; and for his advocacy for clear and full accounts, free from all cookery, he deserves—as, indeed, he receives—the thanks of lords and adventurers, and of all who hate "cooked accounts."

OBSERVER.

Dec. 1.

THE ADVANTAGES OF THE STANNARY COURT.

SIR,—The remarks in last week's Journal on the great cost attendant on a winding up of mines when unfortunately the directors have placed the liquidation in the hands of one of themselves, or a clerk, as official liquidator are correct. My experience, which is large, has shown me that the length of time taken, and the heavy cost of a voluntary liquidator far exceeds the time and cost of an official liquidator by the Stannary Court. In the latter also there is the advantage that justice is meted out to the creditors, and the adventurers are severally made to pay without favouritism their legal liability, and no more. I know of many mines placed in the hands of the purser of a mine, or his clerk, as liquidator many years since, with large assets remaining still in their hands, and the shareholders kept in entire ignorance of what has been done with the money. Take, for instance, a mine in the Liskeard district—Caradon Consols, in 1871 or 1872. The assets were realised, heavy arrears of calls had to be paid, yet no meeting of the adventurers has yet been called, or division of assets made (however large or small they may be).

With regard to Wheal Emma Tin and Copper Mine (Limited) you are not quite correct that the mine was placed in the Court; this was not so. A petition was filed by a creditor that it should be so placed, but rather than have this done the liquidator paid the debt, and, of course, the petition was withdrawn, and the mine is still in the hands of the liquidator, who is not only asking the creditors to accept ten shillings in the pound but the working men are also asked to accept a composition as better than nothing, whilst the general opinion is that there are ample assets if some of the shareholders will pay their liability, and a balance left to divide equally between all the adventurers.

A LARGE ADVENTURER IN CORNISH MINES.

St. Cleer, Dec. 5.

MINING IN NORTH DEVON—SOUTH MOLTON MINE.

SIR,—There is considerable excitement in this locality just now upon the important discovery made at this mine. It is not three months since operations were commenced, and only last week the 12 was reached, where an excellent lode for silver-lead ore has been met with. In one place the lode is worth 1½ ton of ore per fathom, and in the bottom of the level there is a leader of almost solid lead 18 in. wide. The ore is of excellent quality, and I am told that a sample of it had been assayed, and produced 70 per cent. for lead and 20 oz. silver to the ton of ore. A box of the ore was sent on to the London office last Friday, and I think it will be pronounced that a finer and more solid ore is seldom seen. The mine is being drained to the 22, which level it is expected will be reached in a few days. If the lode should be found as good there as in the bottom of the 12 (and old miners say it will be found better) I am not over sanguine in saying the mine will prove one of the best and most rapid successes heard of for years, and be a fine thing for Mr. Watson and his friends. It will also attract attention to this hitherto almost neglected district. There is unlimited mineral ground here

which would pay well if properly developed. With your permission I will occasionally write you a few lines as to the progress of mining in this neighbourhood. DEVON.

South Molton, Dec. 4.

THE ANOMALIES OF MINING.

SIR,—The anomalies of mining share dealings are numerous and striking, as, for instance, West Chiverton in the year 1862 was purchased as a going concern and introduced on the London market in 3000 shares of 10*l.* each. From its first appearance it very justly became a favourite. The dividends for 1863 were simply 15*s.* a share, yet the price advanced to 52½, equal to 425 per cent. premium. The following year the dividends were 3*l.* a share, and the market value advanced in April to 84*l.* and 86*l.* a share, or a premium of 750 per cent.; it receded, however, to 55*l.* in December. It is very evident that at the higher figure the price of shares was greatly inflated, and that as regards the future the public drew largely on the imagination; in fact, the interest paid for the year to purchasers was only 3½ per cent., although 30 per cent. to original subscribers. The next year (1865) the dividends were 4*l.* 7*s.* 6*d.* a share, and the price again stood at 85*l.* in December. For the year 1866 the dividends advanced to 7*l.* 5*s.*, and the price of shares at the close of the year stood at 53*l.* For 1867 the dividends were 8*l.* a share, and the price (Dec. 30) 67½ a share. The following years (1868-69) the dividends were similar, and the price was 150,000*l.* at the close—a falling off of 105,000*l.* in the five years, although the dividends had advanced from 9000*l.* to 24,000*l.* a year, or just within 1900*l.* of the aggregate dividends declared over the period of five years. The first question that arises in the mind of an investor would naturally be—Why should a property paying 9000*l.* a year, in 1864 in the height of a panic, with money at 10 to 12 per cent. sell for 255,000*l.*, when in the year 1869, when money was abundant, speculation rife, and just before the Franco-German War (1870) was paying 24,000*l.* a year, and sell for only 150,000*l.*? There is an anomaly here that requires explanation. In the year 1864 the shares were largely held by the promoters, but five years later the proprietary became greatly extended, and the price became based more on intrinsic worth than "conservative" promise. We ventured at the time to advance that four or five years' purchase was the approximate value of the property, and as much as purchasers ought to give, and the results show that our predictions were correct.

At about the year 1873 considerable controversy transpired, and authorities were divided as to the future prospects of the adventure; many were for suspending and abandoning the workings, but those of a contrary opinion prevailed in the resuscitation of the property, although in no respect approaching its former standard, but it must be remembered that calls of 7500*l.* had to be made, that the advance in price of blende of fully 100 per cent. materially assisted the operations, and tend still to sustain the value of products. The value of mining property is not what it has paid, and in most instances neither that which it is paying, but, on the contrary, that which it is likely to pay in the future. The past and present may sometimes prove important, but it is far preferable, and at all times safer, to ascertain and act on cost of production, depth and extent of lodes wrought, number and value of pioneer points, intersections of lodes and cross-courses, with nature and character of strata, capacity of machinery, future requirements, quantities of ores in reserve, monthly returns contrasted with monthly discoveries, and almost of equal significance, soundness, and efficiency of the executive, for unless the management be practical and economical even a good mine may be worked at a loss, while even the best can be worked at double profits when these combine in their full efficiency. It must be remembered that to become a successful investor one must possess knowledge, judgment, nerve, and money. Knowledge is the product of study, judgment is a natural gift assisted by knowledge, and, indeed, impossible without study, nerve is also a natural gift, but that, too, may be cultivated by the abnegation of excess, and by moderation in all indulgencies. The possession of money may be accidental, or it may be earned by the possessor—but taken in the long run, money belongs to the man who has the power and the will to grasp and to retain.

In the case of this mine it appears from manifest evidence that the local management is sound and practical, while the London supervision is both earnest and searching. It is to be observed that, if no dividend has been paid since January last, a loss of some 3000*l.* has been made through the default of a smelting house, that the market value of lead is considerably depreciated, that labour is high in comparison with the years of past successes, while materials, fuel, timber, drainage, discharge of ores and debris all tend to swell costs of production as depth is attained—thence the finances of the present year have many favourable features that do not appear on the surface, and we may reasonably anticipate better results for 1878. This property has paid back in dividends the 7500*l.* called since the change of management, and sells now for about 40,000*l.*

Under the control of the same secretary—Mr. Granville Sharp—we have two young mines in Yorkshire, not very distant from Pateley Bridge—East and West Craven Moor, selling at or about 30,000*l.* each. In course of time these mines will stand a fair chance of paying dividends, but time and money are required to mature the development of the lodes in depth and length. Pateley Bridge—an old, yet shallow, and formerly exceedingly rich mine—has opened out most satisfactorily, the lode at the 30 yielding 6 tons of lead ore per fathom. We trust that Mr. Sharp will have equal success.

Again, the Van Mine is an unquestionably good property, but its career exemplifies many changes and commercial anomalies, most instructive to the disciple of the "science of investments." For the year succeeding its purchase for 51,000*l.*, and its introduction at 4*l.* 5*s.* a share, it advanced at the close of 1869 to 38*l.* a share, or a market worth of 456,000*l.* (12,000 shares), subsequently to a million and a quarter, and then fell to 300,000*l.* at the close of 1874, and now stands at a market value of 465,000*l.*

We refer to this case to show that dividend mines are in general not one iota more secure and free from risks than progressive, sound, and well conducted young undertakings, and though at present the market value of Van stands, as before stated, at 465,000*l.*—just 9000*l.* more than at the close of 1869, and, at the rate of the last dividend, paying 36,000*l.* annually—we venture to add that five to six years' purchase is fully the maximum worth of shares. At the latter date the aggregate dividends would be 216,000*l.*; add six years' interest of 5 per cent. and we reach the sum of 270,000*l.* To repay this amount the dividends must be maintained to June, 1885, at the rate of 12*s.* quarterly on 15,000 shares, and judging from the reports, and the growing depth of the workings, the future must indeed prove propitious should such brilliant results become achieved. Both the Van and West Chiverton were introduced and fostered by Mr. George Batters, of the Stock Exchange, but we think that rumour speaks correctly in his having long since realised his large holdings. This leads us in the interests of the investor to refer to two other mines also introduced by the same gentleman—Pateley Bridge and the Hultafal; the former situate in Yorkshire, and the latter in Sweden. Just three years ago he purchased the Pateley Bridge Mine, and sold it to Mr. Batters for 10,000*l.*, and he formed a company in 4000 shares of 5*l.* each, of which only 3000 were issued, and subsequently 2700*l.* has been raised on debentures. A great deal of preliminary work has been carried out, and the operations carried down from the 20 to the 30 fm. levels, and the Rake lode very partially opened out. At present this lode in the forebreast yields 6 tons of lead ore per fathom, and the stopes 3 tons per fathom, and just approaching this rich deposit of ore. Other parts yield ores in paying quantities, and there are at least over 20 lodes to be laid open at the depth attained, with 30 fathoms of backs standing up to the adit level, and from which thousands of tons of lead ore have from time to time been wrought at shallower depths, and according to records still in existence the mines were first opened by the Romans, and with slight intermissions worked during the last 500 years. The operations on the various veins at and above the adit, or day level, are fully ten miles in length. Smelting works are erected, and the concern just merging into a brilliant success; yet the shares, 3000 in number, stand at 4*l.*, or 20*s.* discount—say 12,000*l.* for the entirety, with 5000*l.* debenture stock or shares created (2700*l.* only issued). This mine is especially worthy the attention of investors, and a full report upon the various workings and lodes can be had gratuitously upon application to us. There is a peculiar anomaly in the indifference of the public to intrinsic worth manifested in the neglect of this inherently valuable property, which presents a wide and vivid contrast to the ridiculous and absurd recognition of many visionary schemes selling at five and ten-fold the money, simply because they are loudly advocated, and temporarily popular and in vogue; yet in reality more calculated to produce "paying stones" than minerals in paying quantities. Such is the fashion of the day. France threw down the gauntlet, and Germany accepted the gauge. Napoleon III. became an exile, and France paid the penalty. The Czar invaded Turkey; she is now reaping the penalties of her temerity, and it is an open question which will eventually become the greatest loser—*i.e.*, France or Russia.

So it is in mining adventure. The trumpet sounds the charge of the weak and presumptive schemer; hence arise the frequent complaints and disappointments of those who follow clamour, and walk supinely on the surface currents of events, but the disciple of the "science of investments" acts and thinks for himself; it is only after earnest and severe study, investigation, and knowledge of facts that he discriminates between the good and bad, and in adopting the former he secures those prizes that not only enrich himself but benefit all associated therewith, and add to the volume of trade, manufacture, and commerce, and likewise to the material wealth of the nation.

The Hultafall is situate in Sweden, consists of 12,000 shares of 5*l.* each, and yields in abundance both lead and blende. There are some 1200 tons of ores at the surface, and the vein wherever seen is from 3 to 10 ft. of solid ore, and almost free from any admixture of debris or rock throughout. The works have been variously tested and reported on by several eminent experts and acknowledged mining authorities, who concur in pronouncing the deposit one of the most extensive and valuable discoveries near the surface they have ever witnessed. The facilities for economical working are great, and labour cheap. The necessary machinery is bought, and already on the mine in course of erection. Hence it is to be concluded that the ensuing year will see this property very generally recognised and appreciated by a discriminating public, who are ever ready to adopt a sound investment whenever the merits become established. This property, that of Pateley Bridge, and also the Cambrian are well worthy the attention of the disciple of the science of investments at this time. R. TREDINNICK.

Exchange, Coleman-street, London, Dec. 4.

MANGANESE IN DEVONSHIRE.

SIR,—Not many years ago our little village was another—

> "Sweet Auburn,
> A lovely village of the plain,
> Where health and plenty cheered the labouring swain."

Those were happy days, and the rich manganese mine was the cause of its prosperity. Our manganese lode is a very fine one, and it runs through the red sandstone for many miles; and, as it crops up through the lands of Mr. J. Quicke, Sir Stafford Northcote, and Lord Poltimore, there is a wide field for the capitalist. Manganese is one of the most valuable of all the Creator's gifts to the human family, because it imparts strength to iron and steel, and also because of its bleaching properties. I remarked on a former occasion that some of the ore is crystallised, but some of it is of a beautiful blue, or rather hyacinth, tint. E. T. MAY.

Newton St. Cyres, Dec. 4.

DISCOVERY OF LEAD IN WALES.

SIR,—In the Supplement to last week's Journal I noticed two letters, headed respectively "Reported Valuable Discovery in Wales" and "The Discovery of Silver-Lead in Wales." As both your correspondents in their letters mention the neighbourhood of Rhayader, I should judge they alluded to one and the same discovery, and if this be the case I rather think from the description given it is the one I am acquainted with in the same locality. Although it is an important and valuable discovery, and is very graphically and accurately described by your correspondents, yet the proprietors have not decided on giving it publicity, for awhile at least. I cannot undertake to reply through the Journal to the enquiries of Mr. Williams, but any communication on the subject addressed to the undersigned, Tavistock, Devon, will receive attention, and the writer can have all the information he requires.

Dec. 4. C. W. SECCOMBE.

WELSH LEAD MINES—EXTRAORDINARY DISCOVERY OF LEAD AT RHAYADER.

SIR,—In common with your other correspondents I am anxiously awaiting further particulars of the above. I only hope to find it is true, but it seems singular that 200 fms. of so rich a lode could have been proved without our hearing something of it before now; it will if true, however, give a great impetus to our Cardiganshire mines, for although Rhayader is actually in the adjoining county it is so close to the lead-bearing part of Cardiganshire as to warrant me including it in the general term of "Cardiganshire Mines." For many years past lead mining here has been in a very depressed state—a natural result of the unhealthy rush made after mines some ten or twelve years back, when anything in the shape of a sett was eagerly snapped up. No one can deny the richness of our mines; we have only to look back to their history for (say) a century and in its pages we find that great wealth has been the result to many private adventurers. The facilities which the Limited Liability Act gives small speculators of taking their share in large undertakings has, I fear, in the case of mines been sadly abused. To the outside public—to whom we must after all look for our capital—mining is a closed and mysterious book, and they are compelled to make their investments therein entirely upon the reports of experts; and it is but too true, unfortunately, that these are not always to be relied on; mistakes and miscalculations must be expected in all mundane affairs, but wilful misstatements are not only unexcusable, but in the long run very injudicious, and frequently recoil on those who make them, but in the case of mining always unhappily on the district about which they are made. Thus, because X, Y, and Z have made a bad investment in a so-called mine in a district all X, Y, and Z's friends are warned against having anything to do with mines in that district As well condemn a shipbuilder because one of his ships have gone to the bottom; and (to continue the simile), as it not unfrequently occurs, a ship which has been to the bottom is bought for a song, raised, and made as good as ever; so a mine which has been unfortunate is often bought for the mere value of the machinery, and by a "fortunate stroke of the pick" turns up trumps for the lucky purchasers.

It is useless attempting to advise the public in the choice of mining investments. All that can be said is pay more attention to one report from a known and trustworthy man than to half a dozen from men signing themselves "M. E.," or styling themselves "Captains." But I fear it will take some time before public confidence can be regained. This is to be deplored, as many really good things are now lying idle for want of capital; mines that with judicious outlay would in the course of a few years return a hundredfold. I am not going to mention a single name, as it might be thought I did so from interested motives, but it is not difficult to ascertain by a little local enquiry. There has been a great deal said about the ore in Cardiganshire not lasting in depth. Well, it has lasted in many cases to 100 fms. deep, and there are not many mines in the county as deep as that, so that it is easy to invest in a mine which is only 20, 30, or 40 fms. deep.

Some years ago there was some talk of establishing what is termed in America a Mining Bureau—*i.e.*, a place where reliable information could be obtained. It is a pity this is not done (say) at Aberystwith. Our great county magnates, some of whom owe their wealth to the successful mining enterprise of their forefathers, ought to lend their names to such a laudable undertaking. At the present time Great Britain is compelled to import large quantities of lead to meet our demands when by developing our home lead mines we might obtain more than sufficient without importing at all.

I am afraid I have strayed a long way from my starting point, but having had some experience of mining and its vicissitudes in this and the neighbouring counties, I can say from my own knowledge and observation that with judicious selection and outlay mining in this county can be reduced to as near a certainty of success as can mining in any other part of the world. It is lamentable to see the hardworking, self-denying, and, as a rule, abstemious miners of this part of the world reduced to such straights for want of employment, which they cannot in many cases seek elsewhere, owing to family ties, or mayhap to their imperfect knowledge of the English language, and I trust, and inded hope, that the New Year will bring us all better times; and if the discovery which led me into these I fear too lengthy remarks proves true it would go a long way to help— A CARDIGANSHIRE MINER.

Aberystwith, Dec. 5.

VALE OF CONWAY LEAD MINES.

SIR,—This mine has been visited lately by a mining engineer of great experience, who speaks of the present mode of operation, the manner in which the mine so far has been laid out, and the quality and effectiveness of the machinery in the highest terms; and "from the quality of the lodes," he adds, "I consider that you have a mine of great promise." You see here that the language of promise is in the lodes, and not in anything that he saw on the surface. I consider that there is a great analogy existing between the promises of men and mines—the mine that makes all the show on the surface is like the man whose promises, for want of power or principle, or both, go no further; but the mine that makes no great pretensions, but having the internal elements of success, is like the man who has sterling principle and affluence. It is true that all lodes do not speak the same language, although they may exist in close proximity to each other, like as different dialects are sometimes spoken by people living in the same principality, and it is only by a little careful study that they can thoroughly understand each other, so it is only by a little careful watching and comparing certain signs that the most experienced engineers can understand the language of lodes so as to be certain of what they say; and, therefore, the safest guide for one to take who has not had the opportunity of making such investigation is to enquire into the past history, and examine its behaviour under certain conditions. I presume that this is the method by which the above-named person arrived at his conclusion.

Your correspondent "W. R.," in his letter of Nov. 20, it seems, based his argument on the same premises, for it was not until after he had made strict enquiries as to the history of the mine that he ventured an opinion. "W. R." would not be surprised to see the shares go to a premium; my surprise is that they are not that now, and the only reason to account for it is that the shares have never been quoted on the market, the consequence being little is known of it in mining circles. I am taking it for granted that "W. R." is correct in assuming that the shares can be had at a premium, but I am not so sure that his assumption is correct. I would consider a person rather fortunate to be able to buy at that rate. It is not my business, I admit, to interfere in the sharedealing of the company, but I do claim a right to express freely my approval or disapproval of what people say about the mine. Having so lately commenced working it cannot be expected that we have, like our next door neighbour, four years of reserves to draw from, but if we do not in that time pay back a great portion of the money spent I shall be disappointed, with many besides. We shall sell another parcel of lead shortly, which will be followed by regular sales.—*Llanrwst, Dec.* 3. J. ROBERTS.

LLANRWST AND ABERDAUNANT MINES.

SIR,—My clients have been inundated with unsolicited circulars from some eight or ten mining firms, who have obtained their names and addresses from share lists, and in these circulars the shares of East and West Craven Moor Mines (two of the most promising mines in the country) have been quoted and offered at 2*l.* to 3*l.* per share below their actual price for a purpose, hence some shareholders have been induced to sacrifice their shares through false statements, and I have reason to believe have taken Llanrwst at 4*l.* and Aberdaunant at 25*s.* per share in exchange for West Craven Moor; and I know some of my clients have also been strongly advised by letter to sell out East and West Craven Moor shares, and buy into Aberdaunant at 25*s.* and Llanrwst at 4*l.* and 4*l.* 5*s.* per share, the former in 50,000 shares, present price 2*s.* 6*d.* to 5*s.*, and we believe the company is about to liquidate; the latter in 30,000 shares, present price about 2*l.* 10*s.* per share, equal to 75,000*l.* for the property. Certainly a large sum of money for a non-dividend mine.

I make no comment, but leave your readers and the Llanrwst shareholders to judge for themselves; at 50*s.* per share it is 75,000*l.* for the property, but at 4*l.* per share, the lowest price advised in the circulars, it is 120,000*l.*—a fabulous sum of money—whereas East and West Craven Moor are each in 3000 shares only, of 10*l.* each, equal to 30,000*l.* for each property. It is not my practice to send my Investment Circular unsolicited to shareholders in other companies through the means of a share list; however, this month I have favoured the Llanrwst shareholders with a copy, stating my reasons for so doing.

I am sure you will lend your powerful aid, by the help of your largely circulated Journal, to put a stop to such an unprincipled (and, in my opinion, dishonest) practice of sending circulars unsolicited to other brokers' clients through the means of share lists. I regret to say that shareholders in Van, Roman Gravels, West Chiverton, and other good and sound mines have lately been persuaded to exchange for certain shares in very queer concerns.

42, *Poultry, London, E.C.* H. GOULD SHARP.

LLANRWST LEAD MINE.

SIR,—I have received circulars from several mining share dealing firms, all of them strongly advising the purchase of shares in the above property. I find upon reference to your valuable Journal that there are 30,000 shares, and at 4*l.* per share, the price at which I am solicited to buy, it commands a value of 120,000*l.*—certainly a large sum of money for a mine which has never paid a dividend. Aberdaunant shares are also advised at 25*s.* per share. I may add that I never applied to any of these firms for their circulars, and presume they must have obtained my name from some share list. I am informed Llanrwst shares can be bought at 2*l.* 10*s.*, and Aberdaunant at 5*s.* per share, and that such prices are the correct value of the shares. Publicity may prevent many of your readers parting with their money to unknown firms, who it appears, send their trickey circulars to the clients of other brokers through unlawful means (the share lists of other companies) and for unlawful purposes.

A SHAREHOLDER IN MANY MINES.

LLANRWST LEAD MINE.

SIR,—As neither Chairman, directors, or secretary of this company have deigned to reply to my letter of Nov. 22 I presume they cannot do so satisfactorily. I have recently received a letter from Mr. G. Sharp, giving a list of the firms who are with suspicious unanimity strongly recommending the Llanrwst shares at from 4*l.* to 4*l.* 5*s.*; this, no doubt, explains a good deal. I am anxious to know when the promised dividend will be announced, and who is to find the money, for according to the last balance-sheet issued the company appeared to be working at a loss. A SHAREHOLDER.

Dec. 6.

WEST BASSET MINE.

SIR,—I have just received a circular from West Basset Mine, Redruth, asking me to pay my last call in this mine, signed "Cornelius Bawden." Who is Mr. "Cornelius Bawden?" I never saw his name in any circular or report of the mine before. I know nothing whatever of him in connection with the mine, and, therefore, decline to pay my call to any unauthorised person. If it was intended to appoint him as representing the committee of management surely we (the shareholders) ought to have been informed of the same. But, Sir, I ask is there to be no end of blundering in the management of Cornish mines? Three months ago we learnt, through the press, that Capt. James Evans had resigned his position as purser and managing director of this mine. Subsequently we hear it

rumoured, although Capt. Evans said he should not fail sticking to the mine, that he has got rid of 1000 of his shares. But the shareholders are kept in the dark as to these important changes. For my part, as far as I can learn, the adventurers are altogether in the dark as to what has been done to fill up Capt. Evans's important situation, or how the financial affairs of the mine are now managed, or by whom. Surely the adventurers should have been called together immediately after the last meeting to consider to whom should be intrusted the future control of the mine.

A WEST BASSET SHAREHOLDER.

OLD TREBURGETT SILVER AND LEAD MINE.

SIR,—Will you kindly insert a few words in next week's Journal in answer to two letters that appeared last week, written by "An Old Shareholder" and "One who Knows the District," both having reference to the above mine. Your readers cannot but be pleased at the fine style in which "An Old Shareholder's" letter is written, but we would ask him if there are not other channels through which money might flow besides those leading to the pockets of the promoters and lords, for the latter have not received their excessive dues, hence the present distraint in part payment of the same. Then "An Old Shareholder" speaks of the benefit to the employees. Well, supposing a fair day's wage for a fair day's work is a benefit, we would remind him that he, in conjunction with the rest of the company, still owes the miners two months' pay, and we would ask them not to consider their interest in the concern as *nil* until we are paid our hard-earned wages. We are quite prepared to admit that a certain few of the employees have reaped a rich harvest out of the capital expended, which we are in a position to explain to your readers, if need be.

We can assure "An Old Shareholder" that it is not a few of us who offer to work the mine on our own responsibility, but all, with the exception of eight or nine, to whom we referred above. As we said in our last letter, we are prepared to work the mine, not for a few weeks only, but for 12 months, in a straightforward and miner-like manner. We fail to see the "energy, perseverance, and skill" displayed by the present manager which "An Old Shareholder" credits him for. In answer to "One who Knows the District," we know nothing of what the manager may have "dreamed" about, but he positively refused our offer when awake. We doubt not he knows the mine—or, rather, the whereabouts of the account-house—and may be the savoury smell of roasted leg of mutton and beef-steak pies for pay-day dinners is very familiar to his nasal organ.

St. Teath, Dec. 3. THE MINERS OF OLD TREBURGETT.

CAPTAIN JOSEPH VIVIAN.

SIR,—No mine agent in Cornwall should stand higher in public estimation that Capt. Joseph Vivian, of Roscadinnick, near Camborne. He was a manager of mines nearly 60 years, 50 of which he was at North Roskear, which yielded dividends from profits of 110,000*l.* or thereabouts. He was distinguished for the kindness of his disposition, the urbanity of his manners, strict integrity, and sound judgment. When North Roskear was rich testimonials were not in vogue, therefore he never received one, but I think the old gentleman, who is now 85 years of age, should have his last days cheered by that mode of expressing the feelings of respect in which he is held by all who know him. Having heard that steps are likely to be taken at Camborne for raising a fund to buy a piece of silver plate for presentation to Capt. Vivian, I most readily intimate my desire to become a subscriber to it. A SHAREHOLDER.

Truro, Dec. 3.

CARN BREA ACCOUNT.

SIR,—Some time ago when I was coming through the gate of the railway station at Camborne I heard an altercation between the gatekeeper and a gentleman (a mine purser) who had just left the train. The gatekeeper, as in duty bound, asked for the gentleman's railway ticket, which, I think, he could not find, and he was angry with the man for insisting on its production. "My character," said the gentleman, "is above suspicion," which I suppose meant that the man should take it for granted that all was right, notwithstanding the rule which he should observe. It may be that Capt. Teague, in concealing the bank debts and in hurrying away the cost-book and other documents from the table at the late Carn Brea meeting, felt like the gentleman referred to, that his character was above suspicion. Those who know Capt. Teague will give him all the credit which should be given to an honourable man; but the concealment from the adventurers in Carnbrea and Tincroft mines of the bank debts, the paying dividends in Tincroft while such a debt existed, while several months' costs were not charged up, and the unusual practice of keeping the books from adventurers inspection, are circumstances which, with regard to most men, are calculated to excite suspicion and distrust. As it has been the custom from time immemorial to lay the books, merchants' bills, &c., on the table for the inspection, if they wish, of all the shareholders, the question might arise in any mind—Why does Capt. Teague shut us off from this privilege? There must be something to conceal, otherwise the books would be subjected to our inspection. I say that such conduct is open to such a question, and one begins to be curious to enquire into the reason or reasons for such an unusual concealment. People will think that there must be something wrong, whether there is or not anything really wrong further than the wrong of this concealment. If every charge in the books is right what need is there for fear of discussion, which Capt. Teague regards as waste of time? Discussion should be one of the purposes of the meeting. To obviate all grounds for suspicion and comment in the newspapers, I would advise Capt. Teague in the future to lay all the documents before the adventurers in conformity with the usual practice.—*Dec.* 5. A LOOKER ON.

P.S.—I look on Mr. Heard as a friend to mining, proved by his fearless advocacy of open, above-board proceedings. The books of a mine are the common property of the adventurers, and a purser in witholding them violates his duty as their agent. A few months ago Capt. Teague, who would not permit the inspection of Tincroft books, was compelled to submit them to a person who applied to the Stannaries Court for power to inspect. If at the next meeting at Carn Brea the books are witheld the same course should be pursued. It is remarkable that in the case of Tincroft the inspector did not report anything either good or bad.

MORFA-DU MINE.

SIR,—This mine having been brought out under very advantageous circumstances, together with its limited capital of 7000*l.*, ought to command the attention of investors. It should be remembered that holders of these shares have the call of the reserve shares, in the proportion of one for every two held by them, at the price of issue, 1*l.* No promotion money being paid the entire capital is available. The scrip is about being issued from the office, and on receipt of reports a brisk market may be expected to result. If Parys Mountain should strike the solid copper in the 95 cross cut south then Morfa-du is at once established as a success. The area is very large, being 245 acres in extent, and 1000*l.* is sufficient to open out in increased quantities the valuable deposits of bluestone, which is now in good demand at enhanced values, leaving a handsome profit.

If early operations are commenced on the great white rock it is impossible to foretell what results may be obtained when the enormously rich locality is considered. It is the opinion of Capt. Mitchell that a second Parys Mountain Mine may be opened up here. Vast sums of money have been expended by the Parys Company on Morfa-du Mine for developing this property, and machinery costing thousands has been handed over for a mere bagatelle. Shareholders are now looking anxiously for some reports of the mine. A visit to Morfa-du would give tangible proofs that it is no ordinary mine. INVESTOR.

[For remainder of Original Correspondence, see to-day's Journal.]

SOUTH ROSKEAR.—The financial position of this company has much improved, the management having lately been completely altered, being now in the hands of a Glasgow proprietary, Mr. Nathaniel Spens being the secretary and purser, and the debit balance having been reduced by calls from 10,057*l.* to 3090*l.* 13s. 9d. At the meeting in October a call of 15s. per share was made on the 4325 shares liable to call. The company has in hand 1087 relinquished shares, and 588 forfeited shares, the concern nominally consisting of 6000 share, 8*l.* 18s. 4d. paid. It was proposed further to test the property, because the shareholders were liable for the machinery ordered, because the agent's report was hopeful, because one of the shareholders being anxious to get an independent opinion as to the prospects of the mine, employed a private agent to inspect it, and has handed to the committee a copy of that report, in which there are points adverse to the company's position, and reflecting on the past large expenditure; but of the work at present being done at Pendarves shaft it is stated that Pendarves shaft is sunk 3 fathoms below the 106 fm. level, the lode in which is about 3 ft. wide, of a most promising appearance, producing a fair quantity of fluor-spar, with excellent stones of copper ore. This lode has much improved in appearance in the last 3 fathoms sinking, and the shaft should be sunk with all possible speed, as in about 20 fathoms deeper it will in all probability meet with a second elvan course, as nearly all the copper in this mine was made in connection with a similar elvan at the shallower levels. Should the trial fail the committee hope that the amount realised for the machinery would more than cover the additional cost of the present further explorations.

"LESS THAN ONE BOX OF DR. LOCOCK'S PULMONIC WAFERS cured me and my wife of a most distressing cough; we were relieved at once." (Signed) T. Wareing, Deepdale Mill-street, Preston. They instantly relieve bronchitis, asthma, consumption, coughs, colds, rheumatism, indigestion, and taste pleasantly. Sold at 1s. 1½d. and 2s. 9d. per box.

Meetings of Public Companies.

SAN PEDRO (CHILI) COPPER MINING COMPANY.

The ordinary meeting of shareholders was held at the offices of the company, St. Helen's-place, Bishopgate-street, on Tuesday,

Mr. STEPHEN OLDING in the chair.

Mr. F. R. WILSON (the London manager and secretary) read the notice convening the meeting, and the reports and accounts were taken as read.

The CHAIRMAN said he had very little to say in addition to the information contained in the reports for several reasons. In the first place, as the shareholders were aware, Mr. Dunn and himself were only brought in as directors when the company got into difficulties. They had carried on the ministerial part of the business without professing to understand anything about the mine itself. So far the company had been exceedingly unfortunate in all that had taken place in connection with the development of the mine. It was, of course, expected that the mine would turn out a great success. The point in the mine had been arrived at where it was expected that something valuable would be discovered; but instead of a rich lode being found the discoveries had been comparatively worthless, or at all events not sufficient to answer the anticipations that had been formed. He had only to propose the reception and adoption of the directors' report.

Mr. W. DUNN, in seconding the motion, said he had nothing to add to what the Chairman had said, except to join in the disappointment he had experienced at the want of success of the company. He did not, however, think there should be quite that despondency with regard to the success of the mine that the Chairman's remarks might lead the shareholders to think. They were told on all hands that the property had been a most prosperous and remunerative one, and those who were best acquainted with it were still of opinion that great wealth was to be found there. All mines were more or less of a speculative character, but this was looked upon as being less a speculation than in most cases, because the mine has been worked for many years by its original owners, and had been immensely lucrative. These facts had been established over and over again, and hence the anticipations of the success which it was hoped and believed would be achieved by the company. He thought there should be nothing like a feeling of despair at the position of the company, and they should look at the matter from a business and somewhat selfish point of view, and not let the property slip through their fingers altogether to go to people who would, perhaps, make large fortunes out of it. He hoped that some proposal would be made, so that the necessary funds might be provided to carry on operations at the mine. He believed the secretary, who had the affairs of the company at his fingers' ends, and who could exercise a sound judgment in the matter, had already thought of some scheme which might enable the company to raise more money. If funds were not provided there would be no alternative but to wind up the company, and sell the property for what it would fetch.

After a short discussion the directors' report was adopted.

On the motion of the CHAIRMAN, seconded by Mr. DUNN, the London manager's report and the statement of accounts were also adopted.

The CHAIRMAN said it only remained to ask if anyone had any proposition to make with respect to the future of the mine. The shareholders were doubtless aware that the company had got to the end of its funds, and any suggestion as to the future of the company would be very acceptable.

Mr. ASTON thought, under all the circumstances, the better plan would be that the company should be voluntarily wound up. He said this as a holder of 800 shares.

Mr. SARSON said it was very strange that a property which had been worked so successfully by its previous owner, and had even been profitably worked, he understood, by the Court of Chancery, should have proved so unremunerative to this company. He wished to know whether there was any evident reason for such a state of things. The company had been left by some of those who had been principally connected with it—as a sinking ship is left by rats—and the greater credit was, therefore, due to the two directors who had since joined the board. (Hear.)

The CHAIRMAN, in reply, said Mr. Dunn and himself joined the board because two of the directors ceased to be qualified, when only one director remained. They were asked to join the board until better or worse times intervened, and the first thing they did was to make themselves liable for a promissory note for 500*l.* which the previous directors had given. Since that time they had held several meetings, and had issued various circulars endeavouring to raise money—the most ungracious task in which a man could be engaged—and they had received no remuneration whatever. He could not explain why the mine fell off. The original proprietor was said to have derived from 50,000*l.* to 90,000*l.* a year from the mine until the shaft fell in. He then spent about 30,000*l.* on sinking another shaft to reach the point at which the first shaft gave way, and upon his death the Court of Chancery carried the work on for a short time. The only explanation that could be given at all would be that if the original proprietor's shaft had not fallen in when it did he would have met with the results which this company had had.

In reply to a question, Mr. F. F. WILSON said it was not true that the Court of Chancery had derived any profit from the work that was done under its directions.

In the course of some further conversation, the CHAIRMAN said there were no funds, or the directors would have employed an independent mining engineer to visit and report upon the property. His stake in the company amounted to about 4000*l.*——Mr. DUNN remarked that previous to the Court of Chancery having anything to do with the property the shaft fell in, so that the mine ceased to make profits during the life of the original owner.

The SECRETARY said the Court of Chancery only carried on the sinking of the new shaft, so as to make the property a realisable asset. The only ore they took from the mine was that raised in the course of sinking. It was not only the opinion of the present manager of the mine and his predecessor, but it was the universal belief of those connected with mines in the neighbourhood of San Pedro that the property was a very valuable one. It would, however, take some more money to develope it further. From the 135 fm. level the company raised ore to the extent of 16,000*l.* or 17,000*l.*, and at this point a change took place, and the lode was producing yellow sulphurets instead of the coloured ore it had previously been yielding. He believed a similar change to this had taken place in all similar mines to San Pedro in Chili. In the 165 fm. level the ore was found to be much more disseminated, richer in quality, and more plentiful than in the 150, and it was the universal opinion of those connected with Chilian mines that a valuable discovery would be made by sinking deeper. The manto was, as the miners say, "alive for ore," so that there was good hope of an improvement taking place. But to carry the mine 15 or 20 fms. deeper would require 6000*l.* or 7000*l.*, and to raise this sum he could only suggest that as the company had power to issue 9600*l.* more debentures, that sum should, if possible, be raised. That amount would pay off the first charge on the property, and leave enough money to give the mine a really fair trial. It was, however, very doubtful whether in the present time that amount would be subscribed. His son had been the financial manager of the company in Chili for five or six years, and had taken only a blacksmith's wages, although he had refused situations where he would have received 700*l.* or 800*l.* a year from well-known firms, having been desirous of sticking to the company until the success of the mine should be assured. Perhaps, if the shareholders would not take up the debentures preference shares might have the desired result. With respect to the value of the property, he had had an inventory taken, which gave the value of the stores, plant, and machinery on Aug. 31 last at 874,500.

Various suggestions were then made with respect to the best way of raising the additional capital, and the following shareholders were ultimately appointed a committee to confer with the directors and arrange for the raising of the funds necessary to carry on the mine:—Messrs. Sarson, Attrill, Aston, Smith, Brown, and Lundy.

On the motion of Mr. ATTRILL, seconded by Mr. MORGAN, Mr. Sarson was elected a director of the company.

A vote of thanks to the Chairman and Mr. Dunn closed the proceedings.

EAST POOL MINING COMPANY.

At a meeting of adventurers, held at the mine, on Monday (Mr. G. A. MICHELL in the chair), the accounts for twelve weeks' working, showed a profit of 1777*l.* 17s. 7d. On the motion of the CHAIRMAN, seconded by Mr. WOOLCOCK, the accounts were passed, and a dividend of 800*l.* (2s. 6d. per share) declared. The balance of 977*l.* 17s. 7d. was directed to be appropriated as follows:—In payment of engine and plant at Tolvadden, 477*l.* 2s. 6d., and the balance of 500*l.* 15s. be carried to the credit of next account, thereby reducing the debit balance to 2317*l.* It was further proposed by the CHAIRMAN, and seconded by Mr. J. W. BEVAN, that the best thanks of the meeting be presented to Mr. Basset, for his liberal response to the application for a reduction of dues. The following report was presented:—

Nov. 26.—Great Lode: The engine shaft is down 13½ fms. below the 180 fm. level, at which depth we have intersected a lode, and have driven on the same about 6 ft., but cannot speak definitely on its size and character as yet. The 190 is driven east of the sump winze about 15 fms., and is communicated with the winze from the 180. This end is worth for tin 16*l.* per fathom. The 190 is driven west of sump winze 6 ft., and is worth for tin 14*l.* per fathom. At the 180, west of engine-shaft, we are driving south on the cross-course to cut through the lode. We have five stopes working in the back and bottom of the 180—two east in the back and two in the bottom—worth on an average for tin 18*l.* per fathom each stope, and one west in the back worth 12*l.* per fathom. At the 170, east of engine shaft, we have driven south about 15 fms.; the last 2 fms. have gone through lode worth 10*l.* per fathom. We have now set to rise in the back of this level to communicate with the stope above. The stope in the bottom of the 160, on the eastern ground, is worth for tin 12*l.* per fathom.—Engine Lode: The 170 is driven west of engine-shaft about 37 fms., and is producing a little tin—nothing to value. We have not yet reached the cross-course.—Flat Lode: The winze sinking in the bottom of the 140 is down 11 fms.; the last 3½ fms. have gone through the lode, which is worth for tin 12*l.* per cubic fathom. At the 155 on this lode we have two stopes working under the above-mentioned winze, worth for tin 12*l.* per cubic fathom.—South Lode: The 160 is driven east of the cross-cut about 41 fms., and worth for tin 14*l.* per fathom. We have one stope in the back of this level worth for tin 13*l.* per fathom. The 150 is driven west of eastern cross-course 36 fms., and is worth for tin and copper 13*l.* per fathom. The 150 is driven east from the western cross cut 40 fms., and is worth for tin and copper 16*l.* per fathom. There are two stopes working in the bottom of this level, worth for tin and copper 15*l.* per fathom each stope. The winze in the bottom of the 130 is down 5 fms, and is worth for tin and copper 10*l.* per fathom. There are 10 tribute pitches working—tributes differing from 10s. to 13s. 4d. in 1*l.*—JOHN MAYNARD, Manager; CHARLES BISHOP, WILLIAM TIPPETT, Agents.

Mr. R. MARTYN (the purser) explained that in charging for the plant at Tolvadden they embraced every liability against the mine up to the respective dates mentioned in the report. A statement had been made, and had been circulated, that East Pool was considerably more in debt than was stated in the accounts, but he wished it to be understood this was not the case.

WEST WYE VALLEY MINING COMPANY.

The second ordinary general meeting of shareholders was held at the Cannon-street Hotel, on Monday,

Mr. Ross, F.R.G.S., in the chair.

The notice calling the meeting was read by Mr. HENRY G. MOORE, the secretary; the report was taken as read.

The CHAIRMAN said he supposed the shareholders would expect him to say a few words before moving the adoption of the report and accounts. The most important point in the report was that referred to in the third paragraph, which stated in a few plain and concise words what had been the directors' great trouble during the financial year which ended on Oct. 31 last. But there was a saying to the effect that every cloud had a silver lining, and the directors found that the little cloud which overhung this company had its silver lining, for during their periods of disappointment—and the directors had experienced great disappointment at times—they had been very much cheered by the continuance of very important discoveries, which, as Mr. Kitto very happily stated in his report, showed such unmistakable signs of long-continued prosperity. He (the Chairman) believed that the discoveries made in this mine were, without any exception, the most important which had been made in this district throughout this present year; and they were not only important in themselves, but they also, by their strength and character, enabled the directors to very confidently share in Mr. Kitto's anticipations of a career of prosperity and good dividends for this company. (Hear, hear.) The shareholders could have no better proof of this than the piles of ore which were now on the floors, and the very rich ends which were visible in the mine. Not one fathom of ore ground had been stoped or taken away from reserves, and the parcel of 50 tons at present ready for the market were the result of mere drivage and sinkage. But for the wet weather they would have been selling ore regularly every month. He might venture to tell them, and he told them from his own experience, and in doing so he only echoed Mr. Kitto's remarks, and every Welshman would tell them the same thing, that the continuous rains during the last summer had delayed the work in every possible way. It had prevented the men from working out of doors, and inasmuch as the machinery stood at the foot of a considerable hill, a large portion of the hill had to be cut away to form level ground on which to construct the works, and it was found requisite to make the masonry work of unusual thickness, and the foundations the same, in order that they should withstand the pressure of so much earth when loosened and saturated with water. At the present time the works were quite in a condition to stand against the effects of any typical deluge—(a laugh)—without seeing the machinery washed away or the ore buried. All this had occupied time, more than was contemplated; but thanks to the excellent principle of secured dividends during the past two years there had been no need to scamp the work, and they had been able to open up many fathoms of rich ore ground, and so create a large reserve, from which they could by-and-bye draw the requisite amount of ore, and give good dividends, while at the same time the development works would continue, and he believed open up a larger amount of ore ground than they had yet opened up. He only wished it were possible to open up the ground with greater rapidity than they had been able to do, and that the directors could see their way to employ with advantage some of the mechanical aids for boring, which no doubt many of the shareholders had seen mentioned in the mining papers. The attention of the board had been given considerably to this subject, and they had impressed upon Mr. Kitto how important it was that machinery of this class should be employed by him as soon as he could see his way advantageously to use it. (Hear, hear.) Mr. Kitto had gone very carefully and very thoroughly into the question, and was of opinion that the ordinary forms of the rock borers in use at the present time, and said to be so useful in Cornish mines, would be of no use in a formation such as that in which this company's mine was situated. But the directors lived in hope, and Mr. Kitto also, that the time would come, and was not far distant, when some mechanical means would be introduced, which would enable them to overcome the many working difficulties which attended the economical use of these boring machines in Welsh mines. He would now pass on to the balance-sheet, and the directors flattered themselves that it really required no explanation, as it was of the simplest character. There was only one item which he thought it necessary to refer to, and that was the item on the credit side of "law expenses 226*l.* 11s.," which, no doubt, seemed unusually large for a company like this in the second year of its working. It arose from a foolish blunder on the part of their local captain, in respect to one of the tradesmen from whom they purchased timber. The directors were, by the local captain's irregular representation of the circumstance, led to defend an action in connection with timber brought upon the company's premises without any authority from the directors, and owing to the local captain's confused condition of mind at the time of the delivery of the timber the company defended the action and lost it. But experience was a dear school in which to learn, and the directors had now adopted measures by which the local manager could not interfere with the ordering of the materials in future, so there was no fear of any such mishap occurring again. The amount of cash in hand was nearly 2000*l.*, so that as they had arrived at a self-supporting condition there was no need to trench upon the money except for works of development. The report of Mr. Kitto was ample and very interesting. It was dated Nov. 5—very nearly a month ago—and it might be that Mr. Kitto had something more to add with respect to the progress of the mine since that date. He hoped that the beginning of the coming year would see a better price for lead than had been ruling during the last 12 months. Most of the shareholders were aware of the causes which led to the depression of the lead trade. There were strong reasons for believing that the period of depression was all but passed, and were it not for the enforced dulness in every department of the metal trade, especially in copper and lead, he believed they would see a better price. He did not know that he should wish to see the price so high as it was a year ago, but if they could see it at 1*l.* or 30s. higher than now it would give the company the opportunity of paying a very good dividend. (Cheers.) In conclusion, the Chairman moved that the report and balance sheet be received and adopted.——Mr. PRIOR seconded the resolution.

Mr. KITTO said that before he made any observations with regard to the mine it would be right to say a word or two in reference to the timber, to which the Chairman had just referred, and in which he said the law expenses were caused through some foolish blunder of the local manager. As he (Mr. Kitto) might be considered by some of the shareholders present and absent to be the local manager, it was only right to say that the blunder did not occur through him, but it was a blunder of the local captain at the mine, who did not confer with him on the subject, but had the timber sent in unknown to him, and he (Mr. Kitto) did not know anything about it until he saw it on the mine, and when he questioned the local captain about it, the local captain gave explanations which appeared abundantly satisfactory. But when the matter came to be investigated in a court of law it was found that the local captain had concealed many of the facts which he ought to have told him (Mr. Kitto), and thus it was that the lawsuit terminated so unfavourably for the company. With regard to the mine itself, the Chairman had gone so fully into its position and prospects that there was really little left for him to say. The charges which had taken place since the date of his report had been few—very few, indeed; but he might say the prospects now were quite equal to what they were at the time that the report was written. There had been no falling off in any shape or form. (Hear, hear.) The ore in Brook's shaft, now sinking below the 40 fathom level, looked exceedingly well, and the lode in every respect was of a character which would lead any practical man to believe that it was connected with immense bodies of ore of the same class. The 40 fm. level had been driven through very productive ground. He (Capt. Kitto) said he should be very pleased to see more shareholders down to inspect the mine. There was a considerable quantity of rich ore on the surface on the dressing-floors. They had commenced to dress, and he hoped before the end of the year that he should sell a parcel of at least 50 tons. A great deal had been said by the Chairman and others with regard to the wet weather, and there could be no doubt that the surface operations had been greatly delayed thereby, otherwise they would have been selling ore now, and thus kept faith with the shareholders with respect to the statement made at the last meeting—that a sale of ore would be made before the next meeting. It was entirely in consequence of the wet weather that they had failed to do so, but as the year's dividend was guaranteed there was no necessity to spend money recklessly, because the ore was on the mine, if it was not in the market. The ore was there, and would come into the next year's accounts. The ore was there for sale, and it would be all the same to the shareholders whether it came into this year's accounts or the next. The prospects of the mine were exceedingly good. There was a great deal of ore discovered and laid open ready for stoping, but no stoping had been done up to the present time, with the exception of a little bit in the shallow adit level. The shareholders had had their dividends guaranteed thus far, and he had not the least fear of being able to follow them up with equally good from the profits of the mine in future. (Cheers.)

Mr. PRIOR asked whether anything further had been discovered with regard to the bunches of ore referred to at the last meeting?

Mr. KITTO said they had not got underneath that portion of the mine yet, but he did hope to have reached it before the general meeting, but had been unable to do so. They were in close proximity to it, and to the one which was under the 26 last year, and which was now in the 40 driving east.

A SHAREHOLDER: How much have you sunk below the 40 in Brooks' shaft?

Mr. KITTO said about 9 ft., worth about 2 tons per fathom. He saw no difficulty in selling about 40 tons per month to begin with. They might do a great deal more, but he should like to begin as they could continue, and increase afterwards. The shareholders would be perfectly safe in taking the quantity estimated in his report. He had never seen in all his experience, now extending over a period of 35 years, a finer or richer heap of stuff on any mine, simply the result of a comparatively limited amount of driving. Every pound of this ore had come out of the driving of levels and sinking in Brooks' shaft. He had never seen such a large quantity at surface of better quality in his life.

The CHAIRMAN said it seemed to him from all the evidence that Mr. Kitto had brought forward that all the shareholders had to do was to wait patiently for the

results. He would refer for a moment to Mr. Kitto's observations about the local manager. Mr. Kitto was the engineer-in-chief, and he (the Chairman) sorely thought it necessary to make the distinction to which Mr. Kitto had drawn their attention, but in order that no mistake whatever might arise in the minds of shareholders he would state that it was not Mr. Kitto who was referred to in connection with the timber. As regarded the 40 tons per month which Mr. Kitto promised them in the future, he was pleased to hear that they were to have such large sales. It was certainly more than he expected. He thought if they commenced at 30 tons per month, and gradually got up to 50, 60, and 70 tons per month, he should be perfectly satisfied. He might mention that in addition to the evidence offered by the manager the directors had at considerable personal trouble devoted their time to visiting the mine at their own expense whenever it had been necessary; and, perhaps, Mr. Bowman, who had given great attention to local matters, would be good enough to shortly state his opinion of the mine. There was one matter he alluded to a year ago, and he would allude to it again to-day very cursorily—he alluded to the result of some assays made in the early stages of the formation of the company, showing that there were traces of gold in the metallic formation of the lode, and he at the last meeting quoted from Sir Roderick Murchison's well-known work, the "Siluria," in support of that view. Now, he might repeat that further experiments had demonstrated the fact that the lode stuff did contain visible and perceptible traces of gold throughout. This was proved by an experiment which had been practically made at his own suggestion. He did not mean to say that it would lead to anything; he did not think it was of commercial value, but they could not tell in this age of discoveries but what the time might come when it might be worked at a profit. Two years ago no one could have foretold that the telephone would have been brought to the perfection it had been, and it might be that in years to come the gold which was now disintegrated and dispersed in this formation might be utilised.

Mr. W. BOWMAN said he was unable to add anything of importance to what had been already stated, but he could confirm what Mr. Kitto had said with regard to the reserves of ore which had been opened up during the past two years. He believed those reserves would prove very satisfactory to the shareholders. They had been hindered in getting up the machinery, but the directors had done everything in their power to push it forward consistent with efficient workmanship. Seeing the mine was likely to turn out so well, the directors were anxious to have the best and most improved machinery which could be put up, and, therefore, they would not on any account unduly push the works forward. Those of the shareholders who would favour the mine with a visit would, he was sure, be satisfied with the machinery which had been put up. There were three new water-wheels to carry on the dressing and crushing, and ample provision had been made for a very large output of ore, which he hoped would be the result of their labours. (Hear, hear.)

The resolution for the adoption of the report and accounts was then put and carried.

On the motion of Mr. DAVEY, seconded by Colonel EVELEIGH, Mr. W. Bowman was re-elected a director.

Mr. PRIOR moved that Mr. T. Kent be re-elected a director.—Mr. BEDFORD seconded the resolution, and said that they had in this company about the most practical illustration they could have of the value of a guaranteed dividend, because having this guarantee the managers of the mine had been enabled to lay all the works out in such a thoroughly business-like manner, and with such foresight that the shareholders would now reap the benefit of their labours. He believed if the same system were more generally adopted in mines the shareholders would reap a great advantage, because the mine would not then be badly worked in the first instance, and the shareholders would get the full benefit of the delay in the long run. The resolution was carried.

Mr. T. KENT said he had to thank the shareholders for the confidence they had reposed in him in again re-electing him a member of the board. He could only say that he would do his best to see that the interest of the shareholders were well looked after in every possible manner. He was down in the mine on October 31, and he believed the company possessed one of the finest properties in the neighbourhood. He believed it was second to none. (Hear, hear.) He thought there was one advantage in not having sold ore quite so soon as they anticipated, inasmuch as it had slightly gone up in price, and the company would reap the benefit in having the ore still to sell.

Mr. W. BOWMAN also acknowledged his re-election.

On the motion of the CHAIRMAN, seconded by Mr. BOWMAN, the auditor, Mr. M. B. Pike, was re-elected.

The CHAIRMAN said that when they met again he hoped to have the pleasure of announcing a satisfactory dividend.

A SHAREHOLDER: Shall we have half-yearly dividends?—The CHAIRMAN said that if the directors could see their way to paying half-yearly dividends they would do so. But before they could pay an interim dividend special power would have to be taken from the shareholders, as the present Articles of Association did not permit of the payment of an interim dividend without the authority of the shareholders.

Mr. KERLEY, the solicitor, said the difficulty could easily be got over by calling an extraordinary meeting of the shareholders.

Mr. BEDFORD proposed a vote of thanks to the Chairman and directors.—A SHAREHOLDER seconded the resolution, which was carried.

The CHAIRMAN acknowledged the compliment.

On the motion of Mr. PRIOR, seconded by a SHAREHOLDER, a vote of thanks was passed to Mr. Kitto.—Mr. KITTO: I am exceedingly obliged to you. It is well I have the confidence of the shareholders—I believe I have.

The CHAIRMAN: And of the directors too.

Mr. KITTO: The best guarantee I can give you of my desire to do the best I can for the company is the fact that I am one of the largest shareholders of the company, and if I do well for you I am doing well for myself.

The meeting then broke up.

RED ROCK LEAD MINING COMPANY.

The first annual general meeting of the shareholders was held at the offices of the company, Bishopsgate-street Within on Thursday, Mr. J. E. TIBBETTS in the chair.

Mr. J. OWEN (the secretary) read the notice convening the meeting. The directors' and agent's reports and the accounts were taken as read.

The CHAIRMAN said:—I may say, gentlemen, in moving the reception and adoption of the reports and accounts, that I see on looking at the minutes that it is exactly 12 months since we first met for the formation of the company, and I think I may congratulate you on the progress made. I do not know that it has been quite so rapid as our friend Mr Kitto in the first instance said it would be, but, as a simile, when you get into a large, old-fashioned house, with a number of rooms out of repair, you cannot tell exactly how long it will take you to alter, improve, and put it into a perfectly working state as a house of great capabilities. I hope our mine is one of great capabilities, although it has taken a little longer than we expected to get it into perfect order. I think you will hear that it has got into that condition, and a practical proof that is has arrived in that state is that we have been enabled to sample and sell 40 tons of lead. I was rather anxious to know whether we had got all that lead ourselves, or whether any of it remained from the previous workings, and upon seeing Mr. Kitto yesterday asked him that question, and I find that substantially the whole of that is lead we got ourselves—with the exception of about 7 tons. I think that is a satisfactory circumstance. The next important point, probably, to which I should call your attention in dealing with this report is the financial question. The last paragraph of the report is as follows:—"Reference to the balance-sheet will show that of the authorised capital already called up 329*l.* 15*s.* has yet to be received"—some small portion has been received since the report was issued—"that further calls upon shares allotted which have yet to be made amount to 1797*l.* 10*s.*, and that there are also 1000 shares (value 2000*l.*) still held in reserve, but which, as stated in the company's prospectus, would not be issued until the sanction of the general body of shareholders had first been obtained. This sanction your directors intend to ask the shareholders to accord to them at the forthcoming meeting." Just before the meeting commenced I had the pleasure of a conversation with one of the shareholders, who expressed some doubt as to the wisdom of issuing that thousand shares in reserve, and that probably in a very short time we should be able to put them on to the market at a considerable premium. This view of the case it will be for you to consider, and I am sure any conclusion that you arrive at will be considered with all respect by your directors, but at the same time I should tell you that independently of the 1000 new shares we should have from the other sources the further call of 10*s.* a share will produce upwards of 170*l.*, and the residue of the old call would bring it up to about 2000*l.*, so that we should have 2000*l.*, which I believe our friend, Mr. Kitto, thinks will be very nearly sufficient to complete the necessary working at the mine. So that in all probability we should not absolutely require the whole of those shares to be taken up, at the same time it is never well to starve a mine for want of a little capital, and I think if our prospects are what we have every reason to believe them to be it is a fair thing to give our present shareholders the advantage of taking up these additional thousand shares at par. I am rather disposed to recommend that view. At the same time we shall listen to our friend, Mr. Hargreaves' remarks, if he desires to make any, with every respect and attention. There is another subject, perhaps, I should refer to before I sit down, although I hardly like to do so, as I do not like it to be thought that I wish to talk for effect, but a singular circumstance occurred yesterday while we were having a board meeting Mr. Kitto received a telegram stating that a very valuable bunch of ore had been discovered in the 60. Now, I do not mention this to raise any undue expectations on your part, because we have not yet had this telegram confirmed by any letter, but I should not be doing my duty if I suppressed the fact that such a telegram had been received. It may turn out to be a valuable and important discovery, or it may turn out a flash-in-the-pan, although this is most improbable, I do not ask you to attach any importance to it, but I think I should not keep from you the fact of the intelligence being received. If any questions arise upon the accounts I shall be very happy to answer them. I had the pleasure of meeting you so recently as July last, when you will recollect that we had an extraordinary general meeting to obtain your permission, in accordance with the terms of the original prospectus, to make a call of 10*s.* in 1*l.* It will be in your recollection that in our original prospectus we bound ourselves not to make any call within the first twelve months without meeting the shareholders. In July last we found it desirable to make that call, and a meeting was accordingly convened, and you were kind enough to pass a resolution making the calls which has been generally responded to, the balance being only 329*l.*, and this amount has since been reduced. I believe we have only to ask for and to have the balance, so that having so recently addressed you I have nothing more to say. If you wish for any further information I shall be very happy to answer any questions. In conclusion, I will move "That the directors' report, the manager's report, and the financial statement be received and adopted."

Mr. SIMMONDS seconded the motion.

Mr. SHAW asked what the item of 24*l.* on account of ageney was for?—The CHAIRMAN replied that that was the salary paid to the managers.

Mr. SHAW thought the expenses rather high, amounting as they did to 796*l.* on not much more than 30 *l.* He wished to know how many directors there were, as he thought the fees excessive?—The CHAIRMAN, in reply, said there were four directors at present, and their remuneration was fixed by the Articles of Association, a copy of which the shareholders had received. Many of the items were incident to the first year's operations, but would not occur again.

Mr. KITTO said with respect to the item of 24*l.* for agency, of that amount 130*l.* was the salary of the resident agent.

Mr. SHAW expressed himself quite satisfied with the explanation.

Mr. BEDFORD remarked that the actual expenditure amounted to 15,789*l.*, but even taking the figures without the purchase-money there was 715*l.* to be added to the 3073*l.*, which was for additional plant, which increased the expenses to 3800*l.*

The reports and accounts were then adopted.

The CHAIRMAN having called upon Mr. Kitto to make a few remarks,

Mr. KITTO said: Mr. Chairman and Gentlemen,—I have very little to say to you beyond the information contained in my report. It is my usual custom to go pretty fully into the position and prospects of the mines upon similar occasions, and I have done so now. There is just one thing I should like to refer to. Since my report was written we have intersected lead in the bottom of the 72 fm. level, and we have now about 9 or 10 ft further to drive west from the cross-cut to reach the bunch of ore we have been aiming for, and for which the company was started most particularly, and which we have now within a few days' reach. That bunch of ore was, as I have told you in my report, very rich in the 60 and the levels above, and I expect to find it equally rich (judging from the prospects of the bottom of the 60 fathom level, where we went down very rich) in the 72 fathom level, which will take us about a fortnight to reach, when I hope I shall be able to tell you more about it. In my next monthly report you may expect to hear that you have a very good course of ore in that level. The only other point of interest that I need refer to is that mentioned by the Chairman just now, in his opening remarks, with respect to the telegram I received yesterday. I am not at all in favour of receiving such telegrams, and I said to the directors when I received the telegram that I had no expectation of receiving it, for the resident agent has never in his life sent me a telegram before. I had, however, received a letter in the morning, saying that a beautiful lode had been discovered in the 60 fm. cross-cut, to the east of the engine-shaft, where we have been cutting through the lode in order to prove its size and character, but he said then there were only spots of lead. He telegraphed yesterday morning to say there was some beautiful ore in the cross-cut.

A SHAREHOLDER: Will you read the telegram?—Mr. KITTO: Well, if I do I must read the letter also. He says in his letter—"In the 60 east we are still cross-cutting the lode north. I think the cross cut is now in the north part. A finer-looking lode I never saw. It contains beautiful white sugary spar, blende, and spots of lead, letting out water freely." Then the following day (that is, on Wednesday) he sent this telegram—"Cut lode in 60 cross-cut east. Beautiful lode; whole ground, very hard to 10." I may tell you that there is no level between this discovery and the 10 fm. level, so that if this should turn out (I cannot speak positively on the point, as I have not seen it) a rich bunch of ore it will be a very important discovery, as there is a lot of ground above all "high and dry." I should not have referred to the letter or the telegram but that the Chairman thought it right to do so, and I had no alternative. You will easily understand that a discovery such as this, if it is a good one, must be of great importance. We have discovered a good bunch of ore to the north.

Mr. ROSS: Is that the point you refer to in the third paragraph of your report?

Mr. KITTO: It is west of the engine-shaft, not east, that this discovery was made. That is a bunch of ore we shall now get into in a few days in the 72 fm. level, which is quite distinct from the new discovery we have been speaking of, and both will be distinct from the bunch of ore discovered in the 10, to which I have also referred.

Mr. ROSS: You think in the 60 and 72 you will have three valuable points of operation?—Mr. KITTO: Yes, supposing the discovery turns out well. I say in my report—"In the 10, east of the old engine shaft, we have driven through a very nice run of ore ground, but this appears to be an entirely new bunch, as it does not hold up far above the roof of the level, but is by far the best in going down. We have commenced to sink a winze on this, which is yielding about 35 cwts. of lead ore per fathom." We have not seen this in the adit level, and we have every reason to believe that it has not gone up, but down.

Mr. DAVEY asked which way the lode dipped?—Mr. KITTO replied that it dipped very little either way, but a trifle to the west.

Mr. ROSS asked what would be the monthly sales approximately if the discoveries turned out well?—Mr. KITTO said if the discoveries were important the monthly sales ought to be something like 40 tons, which would leave the company a very good profit. He might say one word with regard to the remarks made by one of the shareholders as to the expenses of the agency. When 130*l.* for the resident agent was deducted from the 240*l.*, and it was remembered that he (Mr. Kitto) paid the whole of his travelling expenses there would not be much for his services. He paid his clerks and other agency expenses out of this sum also, so that he thought nobody would say the charge was an extravagant one.

Mr. DAVEY asked whether further machinery was likely to be required?

Mr. KITTO replied in the negative, adding that the present dressing machinery was equal to 200 tons a month, and it would be found to answer its purpose most admirably.

The CHAIRMAN then moved, in accordance with the notice given in the report—"That the directors be authorised to issue and allot 1000 shares held in reserve, and which by the prospectus were not to be issued without the authority of the shareholders in general meeting." He had explained the reasons why the directors desired to have the power to allot these shares. When the allotment would take place would depend on how soon the returns would be more remunerative. He thought the directors should have this power, and that the shareholders should have the opportunity of applying at once for the shares at par.

Mr. SIMMONDS seconded the motion, which was carried *nem dis.*

On the motion of Mr. DAVEY, seconded by Mr. HARGRAVES, Mr. Killingworth was re-appointed auditor.

The CHAIRMAN announced that, in pursuance with the terms of the prospectus, there would be a half-year's interest due on Jan. 1, which would be duly remitted to the shareholders.

On the motion of Mr. HARGRAVES, seconded by Mr. STYLES, a vote of thanks was passed to the Chairman and directors, and the proceedings then terminated.

GREAT SNAEFELL MINING COMPANY.

The annual general meeting of shareholders was held at St. James's Hall, Douglas, on Wednesday,—Mr. H. B. NOBLE in the chair.

The notice convening the meeting was read, and the statement of accounts, showing a profit of 141*l.*, was submitted, together with the report of the directors, which, after referring to the various operations in the mine, stated that they had recently purchased a quantity of self-acting dressing machinery on advantageous terms, and hoped shortly to have it set up, and the accumulated ore-tuff dressed for market. The mine will be forthwith inspected, and a proposal made upon the report to increase the capital of the company. The underground agent's report was also submitted.

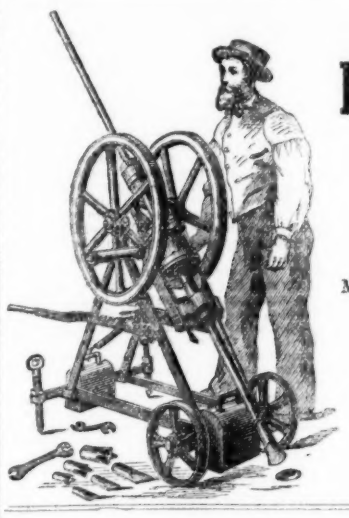
The CHAIRMAN said that although their financial balance was not great, their underground agent's report showed that they had a valuable property. Their balance of assets over liabilities was 356*l.* 7*s.* 4*d.* It was the intention of the directors to obtain the impartial report of an engineer of repute, and then to submit a plan for raising the new capital, the amount of which would depend on the report.

The reports and accounts were unanimously adopted, and Messrs. R. Roney and T. Fisher, who retired by rotation, were re-elected directors, Mr. John Goldsmith being re-appointed auditor.

Mr. ADAMS said that he and Mr. Noble had a large interest in the company, and were, therefore, anxious that any scheme should be adopted by the whole body, so that no one should afterwards express dissatisfaction. He hoped that every shareholder would attend the meeting at which the scheme would be proposed, so that they might not say anything was done behind their back. It was satisfactory that no one could say that the mine had not been fairly and honestly worked and developed to the best of their ability; he had still every confidence in ultimate success.

The CHAIRMAN fully endorsed all that Mr. Adams had said. Their confidence in the mine was shown by their not having parted with a single share.

The usual complimentary votes of thanks terminated the proceedings.



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HAND-POWER ROCK DRILL.

IMMENSE SAVING OF TIME AND LABOUR.

STEAM POWER AND SKILLED LABOUR DISPENSED WITH.

PRICE COMPLETE, £50.

MOUNTED ON SUITABLE STANDS FOR SINKING, DRIVING, AND OPEN QUARRY WORK.

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"Enough was done to demonstrate that the machine was well calculated to take its place in Mining and Quarrying Operations, and to successfully supersede for most purposes the slow and tedious process of hand-boring."

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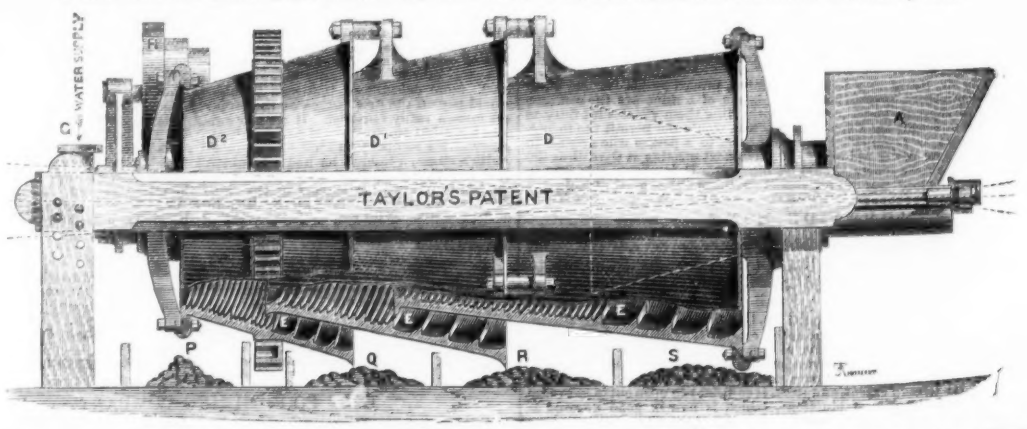
FIRST SILVER MEDAL AWARDED BY THE ROYAL CORNWALL POLYTECHNIC SOCIETY, 1876.



TAYLOR'S PATENT DRUM DRESSER,

FOR SEPARATING AND SIZING MINERAL AND OTHER SUBSTANCES.

By the aid of this invention any materials, which are of different specific gravity, can be concentrated and sorted mechanically, while in the case of ores the fine mineral is brought up with the larger particles instead of being washed into the waste—a most important feature.

This machine uses very little water in proportion to the quantity of material treated, and will be found a most useful and efficient dressing apparatus.

For further particulars, and to see machines at work, apply to the Patentee,

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EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.

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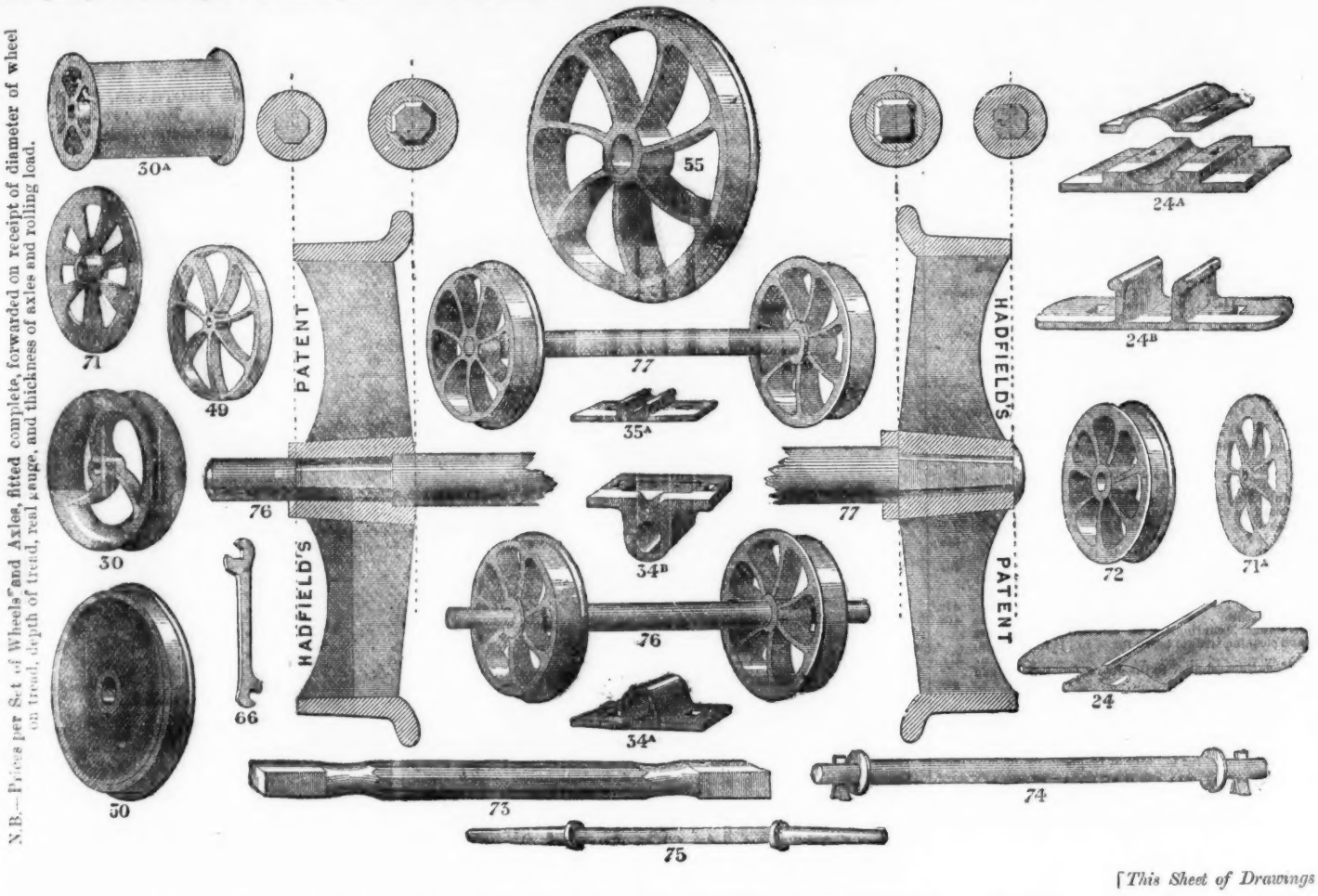
CRUCIBLE STEEL CASTINGS, for Engineering and Machine Purposes,

AND ARE THE SOLE MAKERS OF

HADFIELD'S CRUCIBLE STEEL WHEELS.

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.



N.B.—Prices per Set of Wheels and Axles, fitted complete, forwarded on receipt of diameter of wheel on tread, depth of tread, real gauge, and thickness of axles and rolling load.

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HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very neatly fitted on, and run exceedingly true.

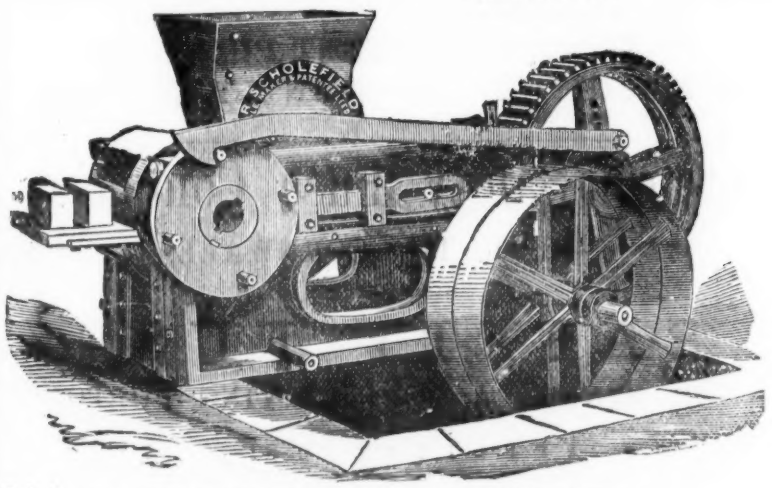
We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one third to one half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

R. SCHOLEFIELD'S
LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pit during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless), is at once made into bricks at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	£0 8 0
1 man grinding, 4s. 6d. per day	0 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0 2 0
1 boy greasing, 1s. 6d. per day	0 1 6
1 engine-man, 5s. per day	0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	0 4 0
Total cost of making 10,000 pressed bricks	£1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.

As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

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(Screw Gland.) Gun Metal *Screw* Gland Steam Cock (black), shell pattern, female ends.

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Prices— ¼ in. 3s. 8d. | ⅜ in. 3s. 4d. | ½ in. 4s. | ¾ in. 6s. | 1 in. 9s. 6d. | 1¼ in. 13s. 6d. | 1½ in. 21s. 6d. | 2 in. 32s. each.

(Screw Bottom.) Gun Metal Screw Bottom Steam Cock (black), shell pattern, female ends, or male and female ends—

Prices— ¼ in. 2s. 3d. | ⅜ in. 2s. 9d. | ½ in. 3s. 3d. | ¾ in. 4s. 6d. | 1 in. 8s. 6d. | 1¼ in. 12s. | 1½ in. 17s. 6d. | 2 in. 26s. each.

(London Pattern.) Gun Metal Steam Cock, London shell pattern, polished bright, male and female ends; the heaviest in the trade—

¼ in., 4s. 6d.; ⅜ in., 7s.; 1 in., 10s.; 1¼ in., 15s.; 1½ in., 22s.; 2 in., 36s. each.

Gun Metal Steam Valves, brass or iron wheels; improved, screwed female ends—

¼ in. ⅜ in. 1 in. 1¼ in. 1½ in. 2 in. 2¼ in. 2½ in. 3 in. 3½ in. 4 in.
4s. 6d. 6s. 6d. 8s. 6d. 11s. 6d. 14s. 22s. 6d. 35s. 48s. 60s. 80s. 120s. each.

The same with Flanges—

¼ in., 7s.; ⅜ in., 8s.; 1 in., 12s.; 1¼ in., 17s. 6d.; 1½ in., 20s.; 2 in., 32s. 6d. each

Gun Metal Ground Steam Union Joints—

¼ in. ⅜ in. ½ in. ¾ in. 1 in. 1¼ in. 1½ in. 2 in.
2s. 6d. 2s. 9d. 3s. 4s. 5s. 6d. 7s. 6d. 10s. 6d. 16s. 6d. each.

Gun Metal Clack or Back Pressure Valve for Feed Pipes from Pumps or Injectors to Boilers—

⅜ in., 4s.; ½ in., 4s. 6d.; ¾ in., 6s.; 1 in., 8s. 6d.; 1¼ in., 11s. 6d.; 1½ in., 14s. each.

Gun Metal Stuffing Box, Expansion Joints for long lengths of Piping—

½ in., 4s.; ¾ in. 6s.; 1 in., 8s.; 1¼ in., 11s.; 1½ in., 14s in., 21s. each.

Gun Metal Safety Valve, with Lever—

½ in., 6s.; ¾ in., 8s.; 1 in., 10s.; 1¼ in., 12s. 6d.; 1½ in., 15s.; 2 in., 20s. each.

Gun Metal Steam Whistle—

1¼ in., 9s. 6d.; 2 in., 12s.; 2½ in., 16s.; 3 in., 25s.; 3½ in., 33s.; 4 in., 40s. each.

Single Tallow Cock—

1½ in. 4s. 6d. | 2 in. 6s. 6d. | 2½ in. 8s. 6d. | 3 in. 12s. 6d. | 4 in. diameter of Globe. 17s. 6d. each.

Double Tallow Cock—

1¼ in. 7s. | 2 in. 9s. 6d. | 2½ in. 12s. | 2¾ in. 14s. | 3 in. 16s. | 3½ in. 18s. | 4 in. diameter of Globe. 24s. each.

Gun Metal Throttle Valves, screwed for iron pipe—

¾ in., 6s. 6d.; 1 in., 9s. 6d.; 1¼ in., 14s.; 1½ in., 19s. 6d.; 2 in., 33s. each.

Gun Metal Pet Cocks, with cleaning screw—

⅜ in., 3s. 11d.; ½ in., 4s. 5d.; ⅝ in., 6s.; ¾ in., 7s.; 1 in., 10s. each.

Gun Metal Pet Cock—

⅜ in,, 3s. 8d.; ½ in., 4s. 6d., ¾ in., 6s. 9d. each. Screwed.

Gun Metal Blow-off Cocks—

¾ in., 7s. 6d.; 1 in., 10s. 6d.; 1¼ in., 14s. 6d.; 1½ in., 19s.; 2 in., 33s. each.

GUN METAL WATER GAUGE MOUNTINGS.

Set of Gun Metal Gauge Mountings, ebony handles, ordinary pattern.
½ in glass ... Per set 16s.
Ditto ditto ditto ⅝ in. glass ... 23s.
Ditto ditto ditto ¾ in. ,, ... 30s.

Set of Gun Metal Water Gauge Mountings, with solid bottom cocks and gun metal packing rings ground on to top of plugs, thus preventing the possibility of leakage, with back nuts and cleaning screws; gun metal handles, bored for either ½ in. or ⅝ in. glass... 31s.

Set of Gun Metal Water Gauge Mountings, similar to the above, but with gun metal flanges, bored for ½ in. or ⅝ in. glass ... 34s.

Set of magnificent Gun Metal Water Gauge Mountings, very heavy, with solid bottom cocks, as above, with cleaning caps, back nuts, &c., &c., bored for either ⅝ in. or ¾ in. glass ... 44s.
Ditto ditto ditto bored ⅞ in. glass ... 56s.

Set of Gun Metal Water Gauge Mountings, with screwed bottom, brass handles, back nuts, and cleaning screws, bored for ½ in., ⅝ in., or ¾ in. glass ... 27s.

Set of Gun Metal Gauge Mountings, similar to the above, but lighter, and bored for ½ in. or ⅝ in. glass ... 23s.

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Inches long.	¼ in. s. d.	⅜ in. s. d.	½ in. s. d.	¾ in. s. d.	⅞ in. s. d.	1 in. outside diam. s. d.	
12	3 9	4 6	5 4	6 8	8 0	per doz.
13	4 0	5 0	6 0	7 4	8 8	,,
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15	4 6	6 0	7 4	8 8	10 0	,,
16	4 9	6 6	8 0	9 4	10 8	,,
17	5 0	7 0	8 8	10 0	11 4	,,
18	5 3	7 6	9 4	10 8	12 0	,,
19	5 6	8 0	10 0	11 4	12 8	,,
20	5 9	8 6	10 8	12 0	13 4	,,
21	6 0	9 0	11 4	12 8	14 0	,,
22	6 3	9 6	12 0	13 4	14 8	,,
23	6 6	10 0	12 8	14 0	15 4	,,
24	6 9	10 6	13 4	14 8	16 0	,,

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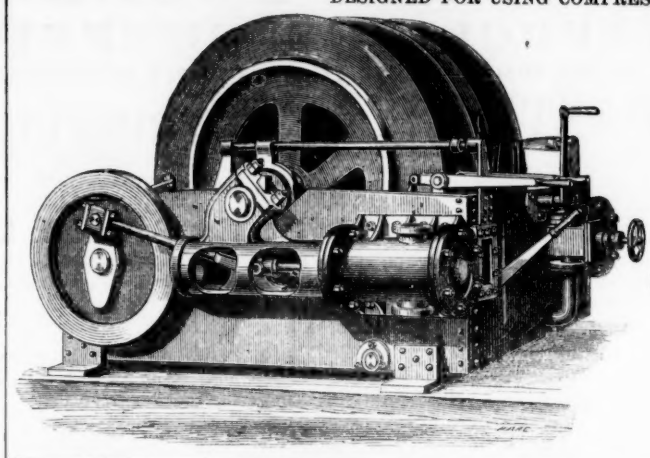
DESIGNED FOR USING COMPRESSED AIR OR STEAM,

SIMPLE, COMPACT, PORTABLE.



Silver Medal, Royal Cornwall Polytechnic Society, 1876.

No. 1 size, 7 in. single cylinder, with 2 ft. drums.
No. 2 size, 9 in. single cylinder, with 2 ft. 6 in. drums.
Larger sizes made with two cylinders.
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D,—12 in. ,, ,, 4 ft. 6 in. drums.

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NEWPORT, MON.

Agents for the six Northern Counties—
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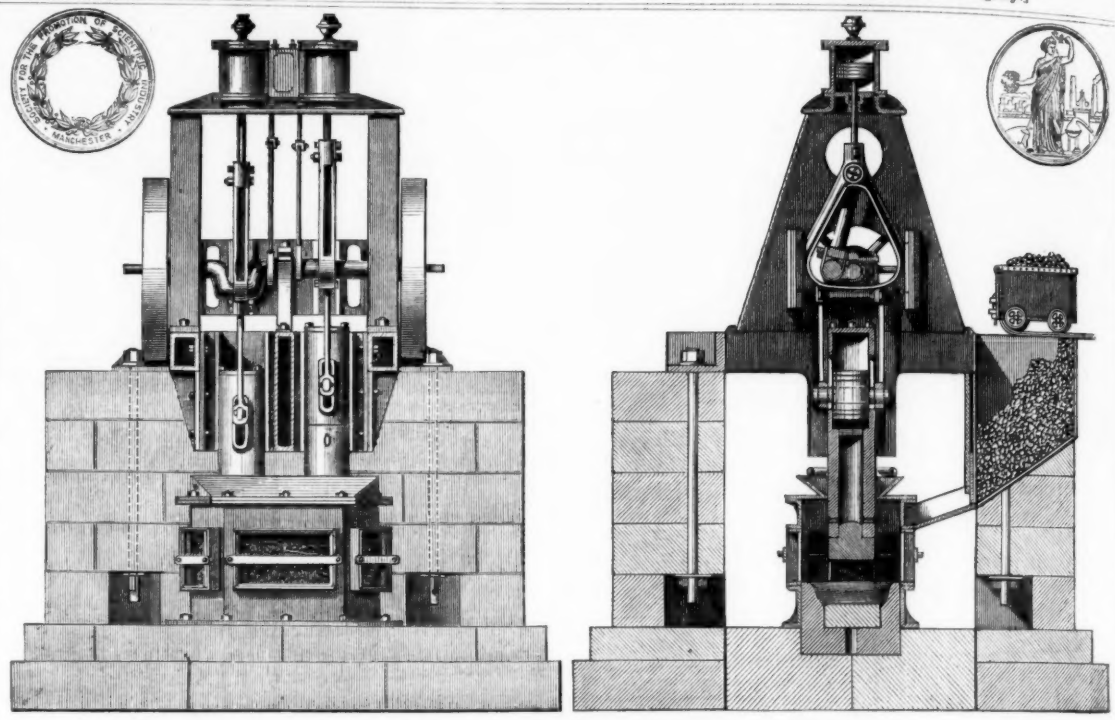
[This Advertisement appears fortnightly.]



SHOLL'S PATENT DIRECT-ACTING
PNEUMATIC STAMPERS,

For Pulverising Tin and Lead Ores, Gold Quartz, &c.,
SOLE MAKERS FOR CORNWALL,

N. HOLMAN AND SONS,

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All objectionable features of "wear and tear" common to the original and existing Pneumatic Stamps (driven by belts) are removed in this patent, and leather bands and stuffing boxes entirely dispensed with, the pneumatic piston being reciprocated into the compressing chambers by direct-action from without. These double machines are guaranteed to be of the capacity of 36 ordinary heads of cam and lifter stamps, and engineers will at once see that, inasmuch as the power is directly applied to its work (without the medium of belts and other gearing), the minimum consumption of coal (all other conditions being equal) must be the result.

The COST OF THESE MACHINES (including boiler) is about ONE-THIRD OF THE ORIGINAL CAM AND LIFTER STAMPS, to do the same work.

ROTARY STAMPERS SUPPLIED ON THE SAME PRINCIPLE, WITHOUT STUFFING BOXES OR GLANDS, WHERE RUNNING GEAR EXISTS, OR WITH HORIZONTAL CONDENSING ENGINES AND BELTS TO DRIVE THEM, IF PREFERRED.

Also, SOLE MAKERS OF STEPHENS' PATENT PULVERISER.

MINING AND OTHER MACHINERY CONSTANTLY ON SALE,
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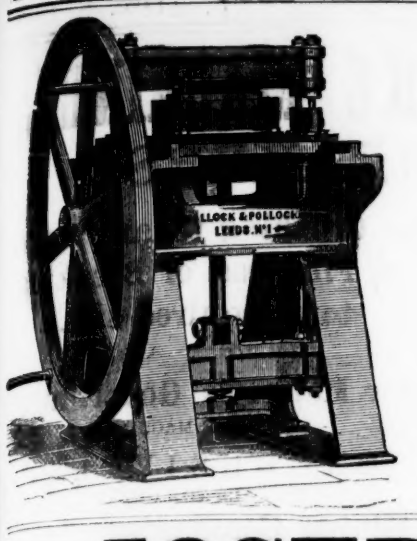
NEW YORK STORE—102, JOHN STREET.



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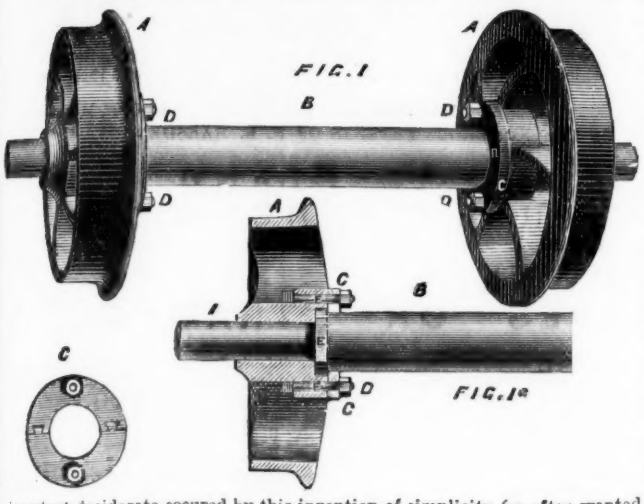
MANUFACTURERS OF

CRUCIBLE CAST STEEL CASTINGS,

HAVE PLEASURE IN CALLING THE ATTENTION OF THE MINING WORLD TO THEIR

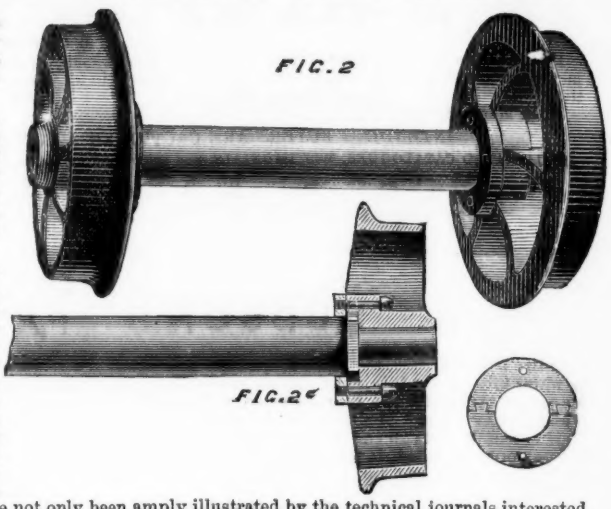
Patent Method of Fitting up Cast Steel Wheels and Axles.

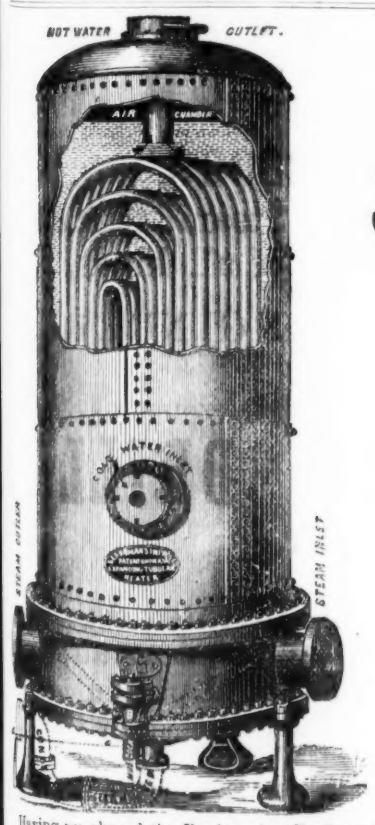


Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings. A A, are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle. Figs. 2 and 2a show a longitudinal view and plan of a pair of corf wheels fitted up for inside bearings. The washers are secured to the boss of the wheel in outside bearings by bolts and nuts, and in inside bearings by set screws.

The advantages of the above system are:—A, the singular simplicity of fitting—enabling any inexperienced person, with the aid of a spanner or screw-driver, to detach the wheels from the axle or fit them together in a very short time. B, perfect solidity, the wheels and axles becoming as one piece. C, durability, no need or putting the wheels or axles into the fire, under any circumstances, which is so detrimental to wheels, rendering them remarkably brittle, and which under other systems are detached from the axle by the aid of fire. D, economy in fuel and wages, saving hundreds of pounds yearly to large coal owners. The important desiderata secured by this invention of simplicity (so often wanted in patents), solidity, durability, and economy, have not only been amply illustrated by the technical journals interested in the progress of mining operations in this country, but have at once been fully recognised by leading authorities in the mining world.





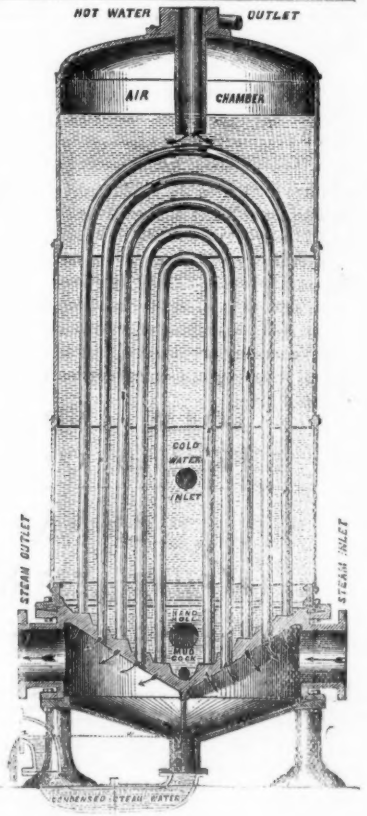
IMPORTANT.

JOSEPH WRIGHT AND CO.

(LIMITED),

NEPTUNE FORGE ENGINE AND BOILER WORKS,

TIPTON, STAFFORDSHIRE,



Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 28, Wilson-street, Finsbury-square, London, have removed the whole to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage of manufacture.

Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

GREATLY REDUCED PRICES.

This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.

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Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top HOT into the boiler direct. Where the WATER WORKS PRESSURE is sufficient no pump or injector is needed.

The water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided, the sewage and other loose matter in the water being deposited in the Heater, the acids are liberated there instead of in the boiler.

Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-HOUSES, AQUARIA, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are now at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using TWO HUNDRED AND THIRTY-THREE of these Heaters.

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WITH THE

New Patent Reversible

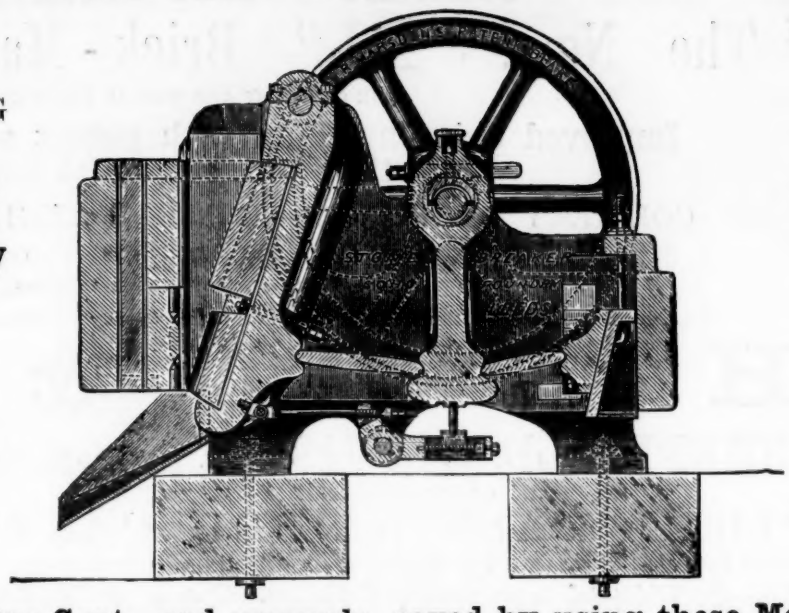
CRUSHING OR CUBING JAWS,

WHICH ARE CONSTRUCTED OF A PECULIAR MIXTURE OF METAL, WEARING

Four times longer than any other.

60 GOLD AND SILVER MEDALS.

OVER **2000** NOW IN USE.



For Crushing to any degree of Fineness, or Breaking to a required size.

Her Majesty's Government

USE THESE MACHINES

EXCLUSIVELY,

ALSO ALL THE GREAT

Mining Companies of the World.

H. R. M. has long observed the want of cheaper machines,

STONE AND ORE CRUSHERS,

And has at length, by means of improved appliances for the production thereof, been enabled to reduce the prices, yet keep up at the same time the well-known strength of construction. Reduced prices on application.

FIFTY per Cent., and upwards, saved by using these Machines.

TESTIMONIAL FROM MESSRS. JOHN TAYLOR AND SONS.

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DEAR SIR,—We have adopted your Stone Breakers at many of the mines under our management, and are pleased to be able to state that they have in all cases given the greatest satisfaction. We are, yours faithfully, JOHN TAYLOR AND SONS.

H. R. Marsden, Esq.

Royal Agricultural Show, Liverpool, July, 1877.

DEAR SIR,—I have broken over 40,000 tons of very hard LIMESTONE into ROAD METAL, for the Newport and other Road Trusts, in your PATENT STONE BREAKER, AND ALL WITH ONE PAIR OF JAWS, which are STILL IN USE. I do not think at all, but am quite sure your are the only Machines which fully perform the work you set them out to do, and there are none in the Show can at all compare with them. Yours, truly,

H. R. Marsden, Esq. WILLIAM PRICE, Contractor, Gold Cliff, Monmouth.

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T. VAUGHAN and CO.'s TRUSTEES, South Medomsley Colliery; and others.

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